Benton Crossing Residential Development

Traffic Impact Study

Columbia, South Carolina

Prepared for

Woda Cooper Companies, Inc.

Prepared by

Kimley»Horn

June 2021

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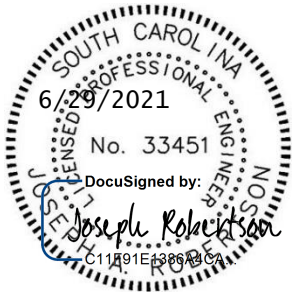

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June 2021

802 Gervais Street, Suite 201
Columbia, South Carolina, 29201

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Executive Summary

The proposed development is located just west of the intersection of River Drive (US 176) at Benton Street and is proposed to consist of up to 56 multifamily residential affordable housing units. The development is anticipated to access the roadway network via a single full-access project driveway along Benton Street.

It was assumed that the development will be built and fully occupied by 2024. Therefore, future traffic conditions were evaluated for the 2024 horizon year. This study summarizes the results of the traffic analyses at the following three study intersections.

1) River Drive (US 176) at Benton Street
2) River Drive (US 176) at Main Street (US 21)
3) Benton Drive at Access #1

The results of the traffic analyses indicate the following improvements to accommodate site traffic accessing the proposed development:

Benton Street at Access #1

- Install a southbound shared left/right egress lane and a single ingress lane

1 Introduction

The purpose of this traffic impact study is to review the vehicular traffic impacts of the proposed Benton Crossing residential development in Columbia, South Carolina. The proposed development is located just west of the intersection of River Drive (US 176) at Benton Street and is proposed to consist of up to 56 multifamily residential affordable housing units. The development is anticipated to access the roadway network via a single full-access project driveway along Benton Street. The location of the proposed development is illustrated in Figure 1.

Figure 2 shows the proposed site plan for the development.

It was assumed that the development will be built and fully occupied by 2024. Therefore, future traffic conditions were evaluated for the 2024 horizon year. This study summarizes the results of the traffic analyses of 2021 existing conditions, 2024 no build horizon conditions, and 2024 build-out horizon conditions during the AM and PM peak hours.

The study area determination was determined based on coordination with the City of Columbia. The project study area consists of the following three study intersections.

1) River Drive (US 176) at Benton Street
2) River Drive (US 176) at Main Street (US 21)
3) Benton Street at Access #1

1.1 Existing Conditions

River Drive (US 176) is a two-lane, undivided, urban principal arterial with a posted speed limit of 35 mph. Based upon SCDOT data, 6,200 vehicles per day traveled along River Drive in 2019 at a count station located west of the River Drive and Main Street intersection.

Main Street (US 21) is a four-lane, undivided, urban principal arterial with a posted speed limit of 35 mph. Based upon SCDOT data, 13,000 vehicles per day traveled along Main Street in 2019 at a count station located north of US 176 and 16,200 vehicles per day traveled along Main Street in 2019 at a count station located south of US 176 .

Benton Street is a two-lane, undivided, urban local road with a posted speed limit of 30 mph. No daily count data is available for Benton Street.

The existing geometry and traffic control for the study area intersections is illustrated in Figure 3.

Study Intersections

1.) River Drive at Benton Street

2.) River Drive at Main Street

3.) Benton Street at Proposed Driveway

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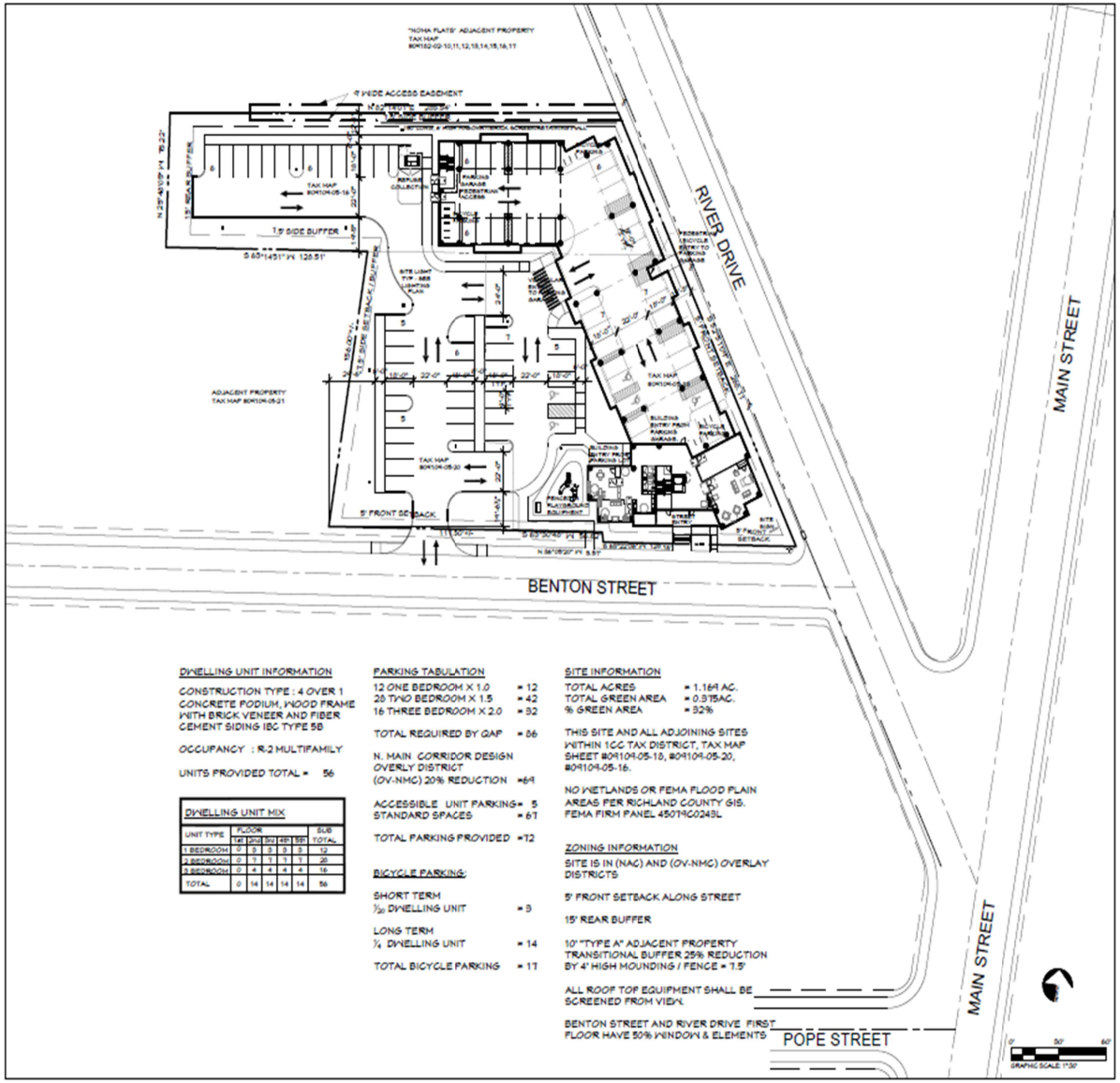
Benton Crossing Residential Development

Figure 1 - Site Location and Study Area Map



DWELLING UNIT INFORMATION

CONSTRUCTION TYPE : 4 OVER 1 CONCRETE PODIUM, WOOD FRAME WITH BRICK VENEER AND FIBER CEMENT SIDING IBC TYPE 5B

OCCUPANCY : R-2 MULTIFAMILY

UNITS PROVIDED TOTAL = 56

DWELLING UNIT MIX

UNIT TYPE	FLOOR 1st	2nd	3rd	4th	5th	SUB TOTAL
1 BEDROOM	0	3	3	3	3	12
2 BEDROOM	0	7	7	7	7	28
3 BEDROOM	0	4	4	4	4	16
TOTAL	0	14	14	14	14	56

PARKING TABULATION

12 ONE BEDROOM X 1.0 = 12
28 TWO BEDROOM X 1.5 = 42
16 THREE BEDROOM X 2.0 = 32

TOTAL REQUIRED BY GAP = 86

N. MAIN CORRIDOR DESIGN OVERLY DISTRICT (OV-NMC) 20% REDUCTION =69

ACCESSIBLE UNIT PARKING = 5
STANDARD SPACES = 61

TOTAL PARKING PROVIDED =72

BICYCLE PARKING:

SHORT TERM
1/20 DWELLING UNIT = 3

LONG TERM
¼ DWELLING UNIT = 14

TOTAL BICYCLE PARKING = 17

SITE INFORMATION

TOTAL ACRES = 1.164 AC.
TOTAL GREEN AREA = 0.375AC.
% GREEN AREA = 32%

THIS SITE AND ALL ADJOINING SITES WITHIN 1CC TAX DISTRICT, TAX MAP SHEET #09104-05-18, #09104-05-20, #09104-05-16.

NO WETLANDS OR FEMA FLOOD PLAIN AREAS PER RICHLAND COUNTY GIS. FEMA FIRM PANEL 45019C0243L

ZONING INFORMATION

SITE IS IN (NAC) AND (OV-NMC) OVERLAY DISTRICTS

5' FRONT SETBACK ALONG STREET

15' REAR BUFFER

10' "TYPE A" ADJACENT PROPERTY TRANSITIONAL BUFFER 25% REDUCTION BY 4' HIGH MOUNDING / FENCE = 1.5'

ALL ROOF TOP EQUIPMENT SHALL BE SCREENED FROM VIEW.

BENTON STREET AND RIVER DRIVE FIRST FLOOR HAVE 50% WINDOW & ELEMENTS

ARCHITECT OF RECORD	PROJECT TYPE	SHEET NAME	DATE	PROJECT NAME	SUBMITTAL	SHEET
D.E. WEATHERBY & ASSOCIATES 4716KNOTTY KNOLLS DR. GAHANNA , OH 43230	MULTI-FAMILY HOUSING	SITE PLAN	5-12-2020	BENTON CROSSING 2615 RIVER ROAD COLUMBIA, SOUTH CAROLINA	2021 SC LIHTC APPLICATION	A2.1

Benton Crossing Residential Development
Figure 2 - Proposed Site Plan

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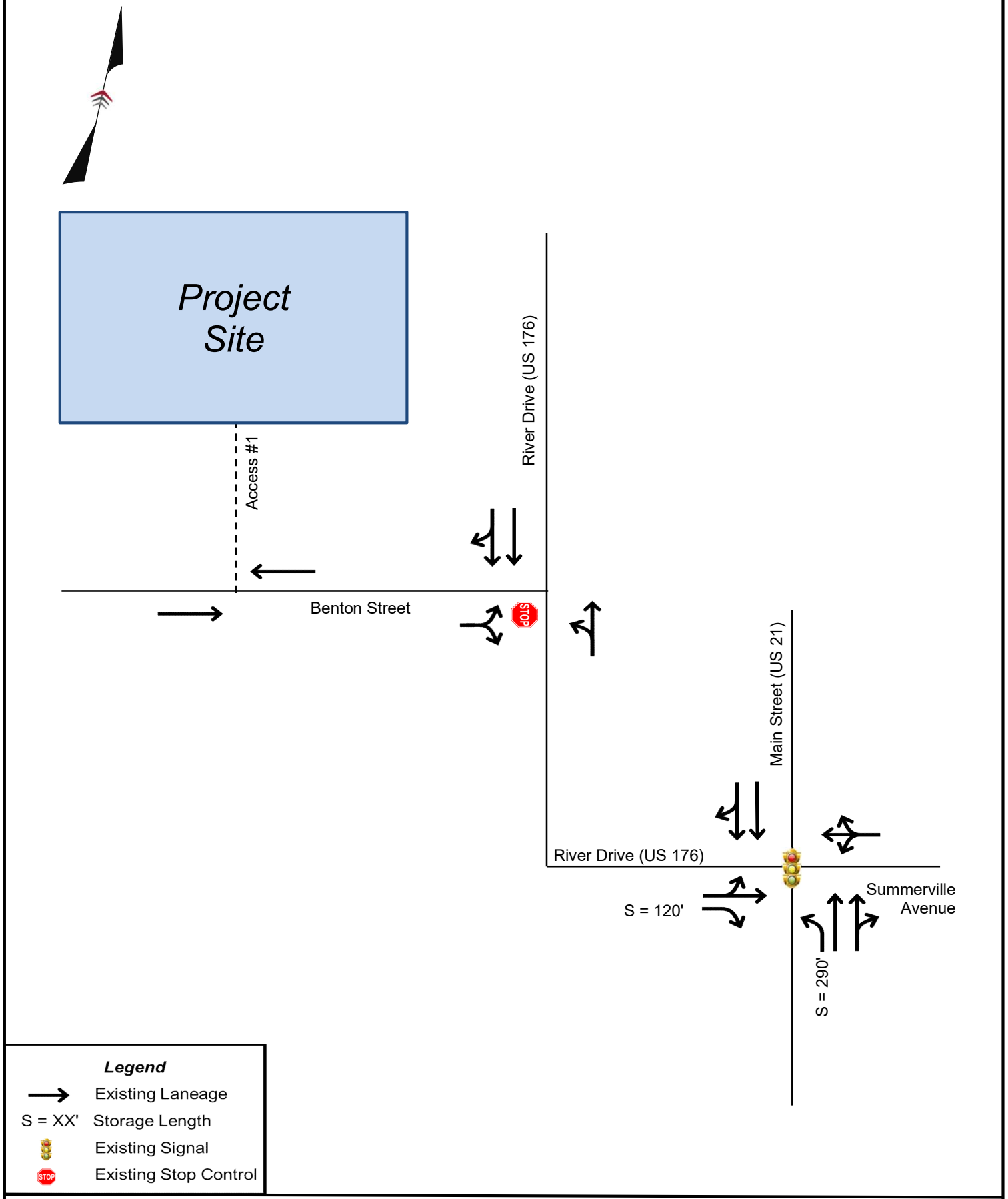

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Benton Crossing Residential Development
Figure 3 - Existing Laneage

2 Project Traffic

2.1 Trip Generation

The trip generation rates and equations published in the Institute of Transportation Engineers' (ITE) *Trip Generation Manual, 10th Edition* were used to estimate the trip generation potential for the development. The analysis was performed using the information provided for land use code (LUC) 223 – Affordable Housing. It should be noted that, ITE has limited data for LUC 223; however, as compared to LUC 221 – Multifamily Residential (Mid-Rise), a similar land use, the calculated number of trips for LUC 223 provides a more conservative approach and therefore was selected as the most representative land use for this analysis.

Due to the residential single land use nature of the development, internal capture and pass-by trip reductions are not included in the trip generation analysis.

The estimated trip generation for the Benton Crossing is summarized in Table 1, which indicates that the development is anticipated to generate 57 trips (40 in/17 out) during the AM peak hour and 35 trips (21 in/14 out) during the PM peak hour.

Table 1 – Trip Generation Summary

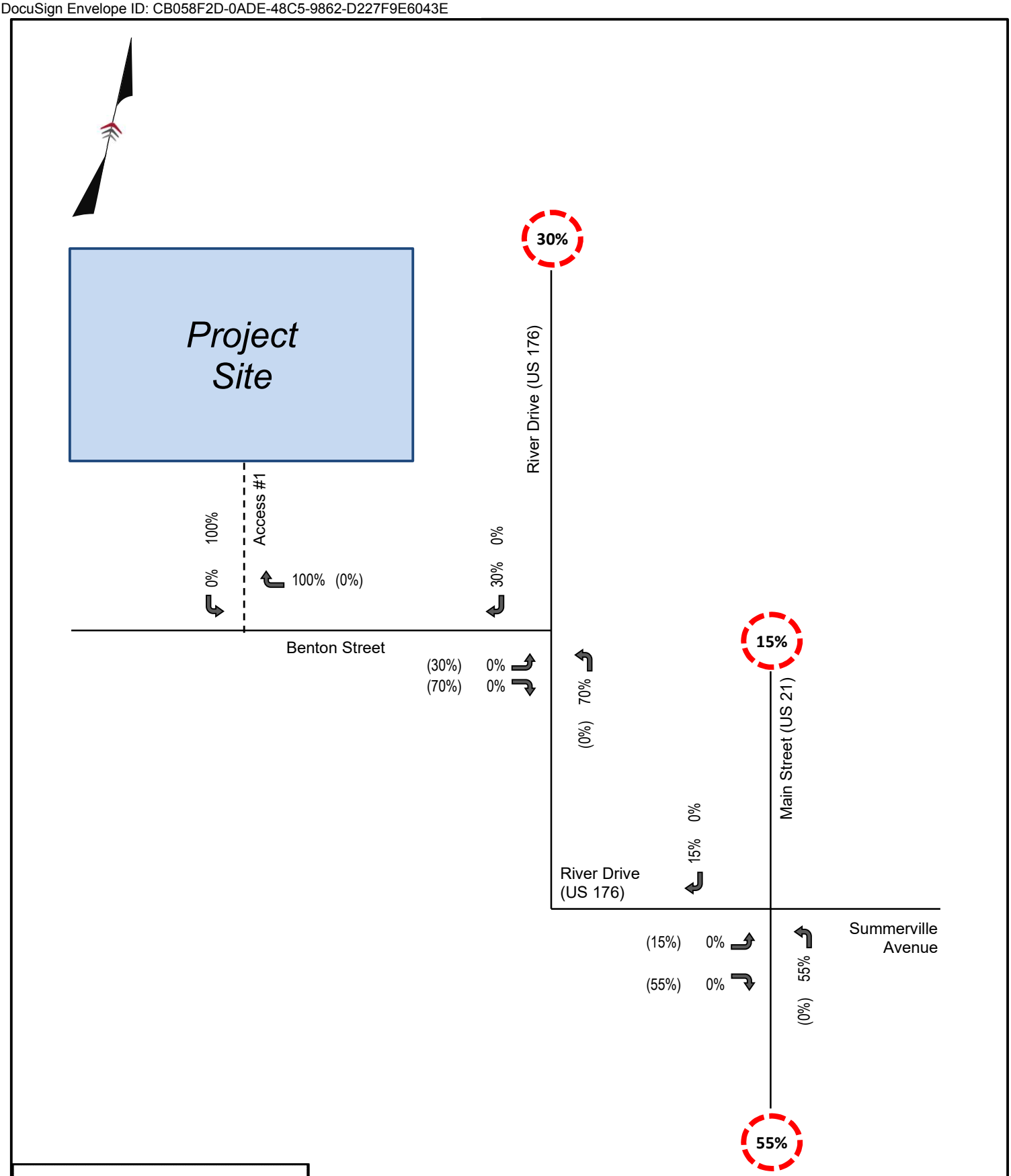
Benton Crossing Trip Generation								
Land Use	Intensity	Units	AM Peak Hour			PM Peak Hour		
			Total	In	Out	Total	In	Out
Affordable Housing	56	DU	57	40	17	35	21	14
Total Net New External Trips			**57**	**40**	**17**	**35**	**21**	**14**
Note: Trip generation was calculated using the following data:								
AM Peak-Hour Traffic Generation								
Affordable Housing	ITE 223	=	T = 1.02 (X); (70 % In; 30 % Out)					
PM Peak-Hour Traffic Generation								
Affordable Housing	ITE 223	=	T = 0.62 (X); (61 % In; 39 % Out)					

2.2 Trip Distribution & Assignment

New external trips generated by the proposed development were distributed and assigned to the surrounding roadway network based on existing travel patterns, surrounding land uses, and the proposed site layout. The trip distribution percentages used in this analysis are as follows.

- 55% to/from the South via Main Street (US 21)
- 15% to/from the North via Main Street (US 21)
- 30% to/from the North via River Drive (US 176)

The site trip distribution and proposed new external trips are illustrated in Figure 4 and Figure 5, respectively.



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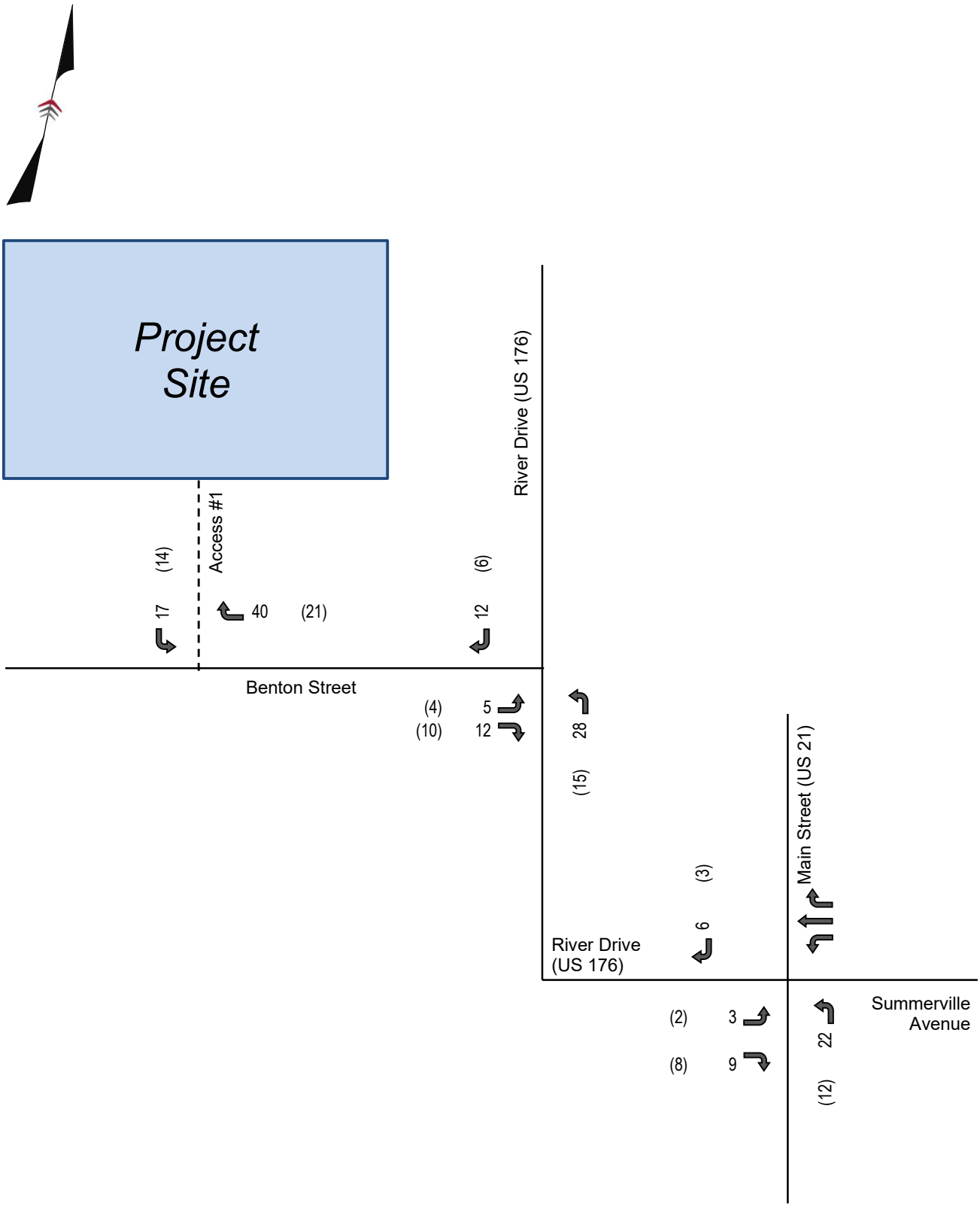
Benton Crossing Residential Development

Figure 4 - Project Trip Distribution



Legend

xx AM Peak-Hour Project Trips

(xx) PM Peak-Hour Project Trips

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Benton Crossing Residential Development

Figure 5 - Net New External Project Trips

3 Future Traffic Volume Development

Existing 2021 traffic volumes were utilized in the analysis and future-year traffic volumes were developed for projected 2024 traffic conditions. The future-year volumes consisted of the existing traffic volumes adjusted by an annual growth rate and the projected traffic volumes of the Benton Crossing residential development. Worksheets documenting the traffic volume development are provided in Appendix D.

3.1 2021 Existing Traffic

Peak-hour intersection turning movement counts were conducted in the AM peak period (7:00 AM to 9:00 AM) and PM peak period (4:00 PM to 6:00 PM) on Wednesday, June 2, 2021.

Figure 6 illustrates the 2021 existing peak-hour traffic volumes for the AM and PM peak hours. The raw turning-movement count data is included in Appendix A.

3.2 Future-Year No-Build Traffic Development

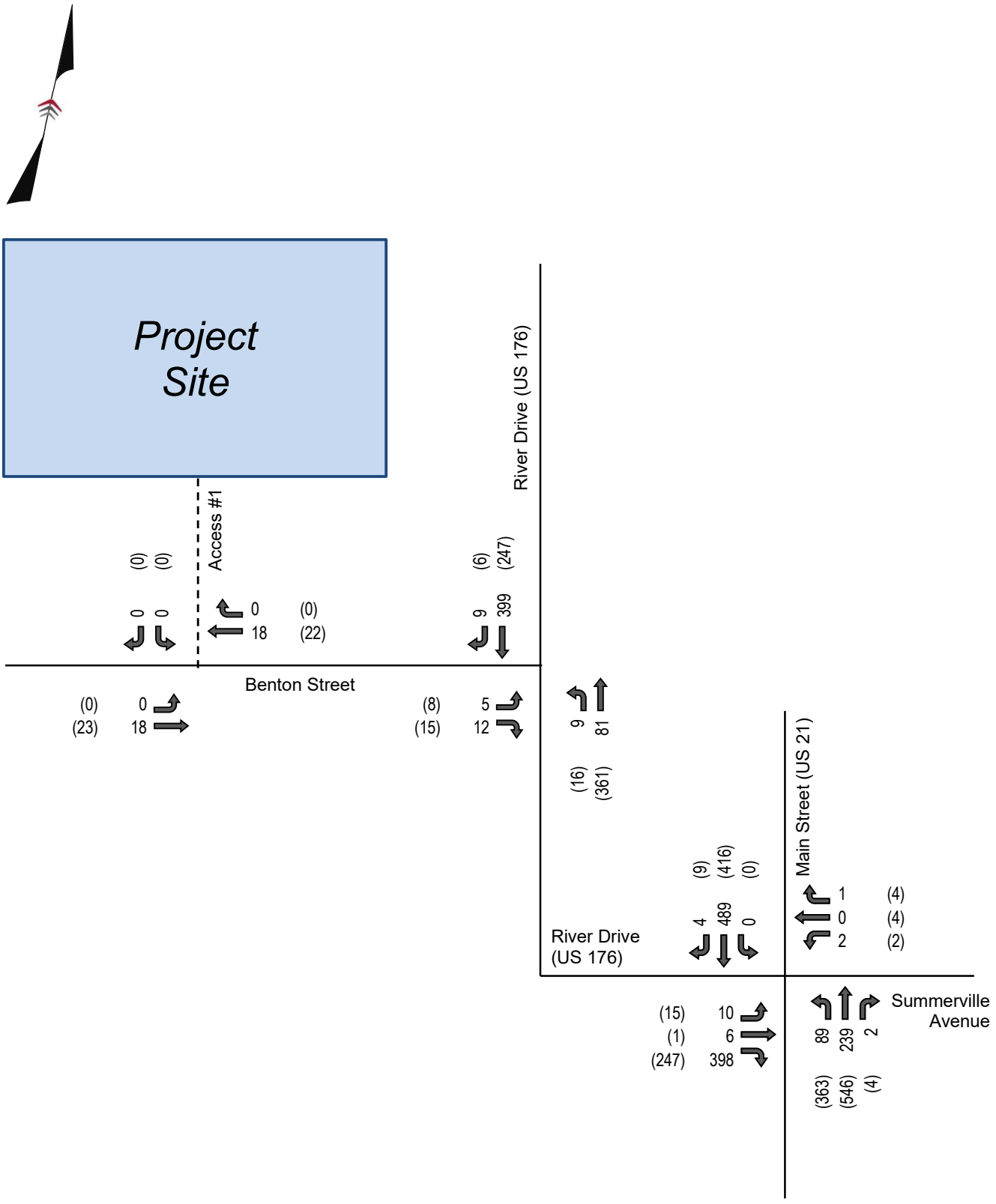
It was assumed that the development will be built and fully occupied by 2024. Therefore, future traffic volumes were developed for the 2024 horizon year. The future-year traffic volumes consist of the 2021 existing traffic volumes adjusted by a growth rate for the no-build scenario.

To determine the historical growth rate in the area, traffic count data was obtained from SCDOT for the count stations along River Drive (US 176) and Main Street (US 21). Over the past ten years, these roadways have experienced minimal growth. To provide a conservative approach, an annual growth rate of 1.0% was applied to the 2021 existing traffic to develop the no-build traffic volumes for the 2024 horizon year. A worksheet documenting the growth rate determination is included in Appendix C. No approved, committed developments were identified within the study area.

Figure 7 illustrates the 2024 no-build traffic volumes.

3.3 Future-Year Build Traffic Development

The Benton Crossing project traffic volumes were added to the no-build traffic volumes to develop build traffic volumes for the 2024 horizon year. Figure 8 illustrates the 2024 build-out traffic volumes for the AM and PM peak hours.



Legend

xx	AM Peak-Hour Traffic Volumes
(xx)	PM Peak-Hour Traffic Volumes

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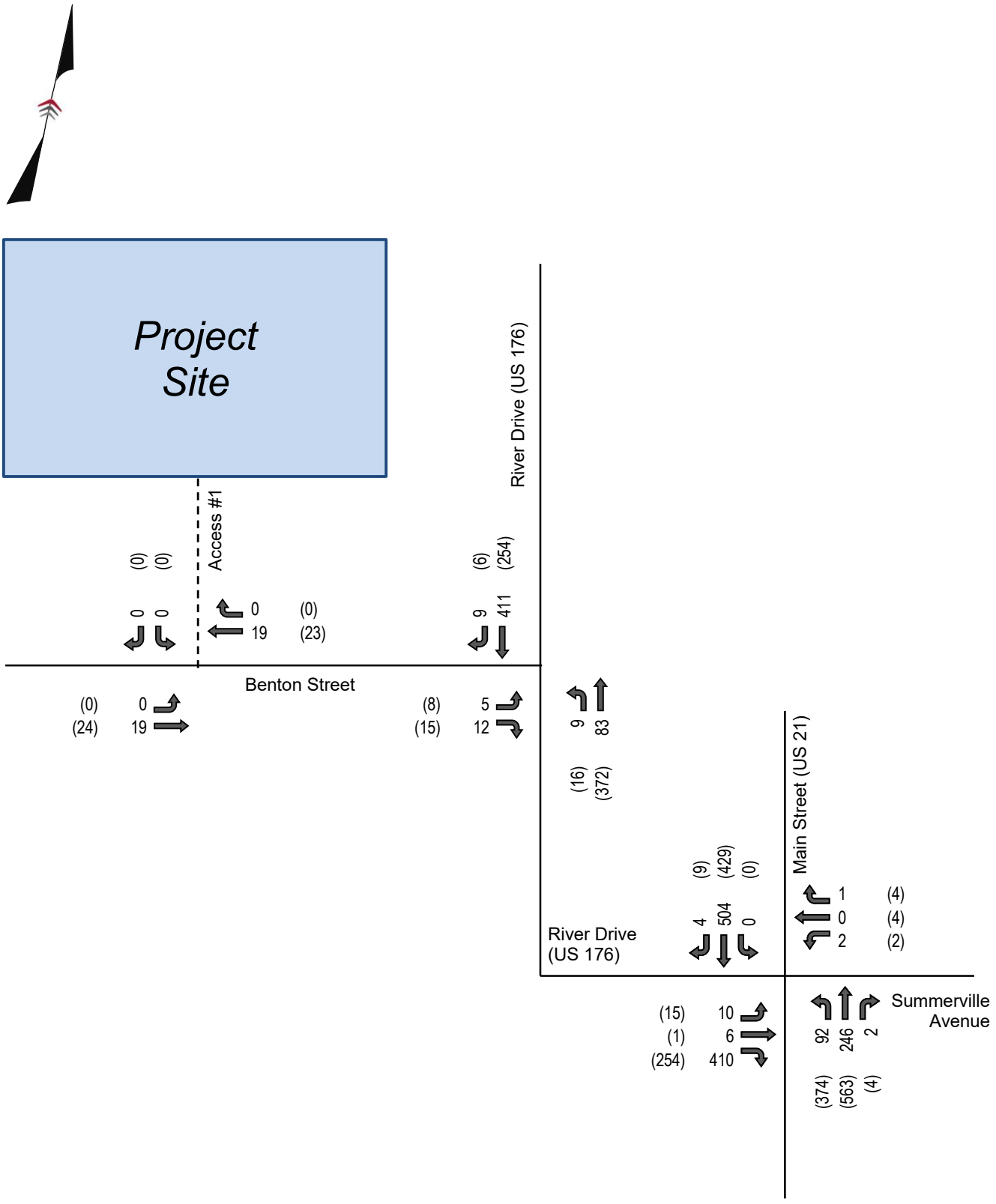
Figure 6 - 2021 Existing Peak-Hour Traffic Volumes



Legend

xx AM Peak-Hour Traffic Volumes

(xx) PM Peak-Hour Traffic Volumes

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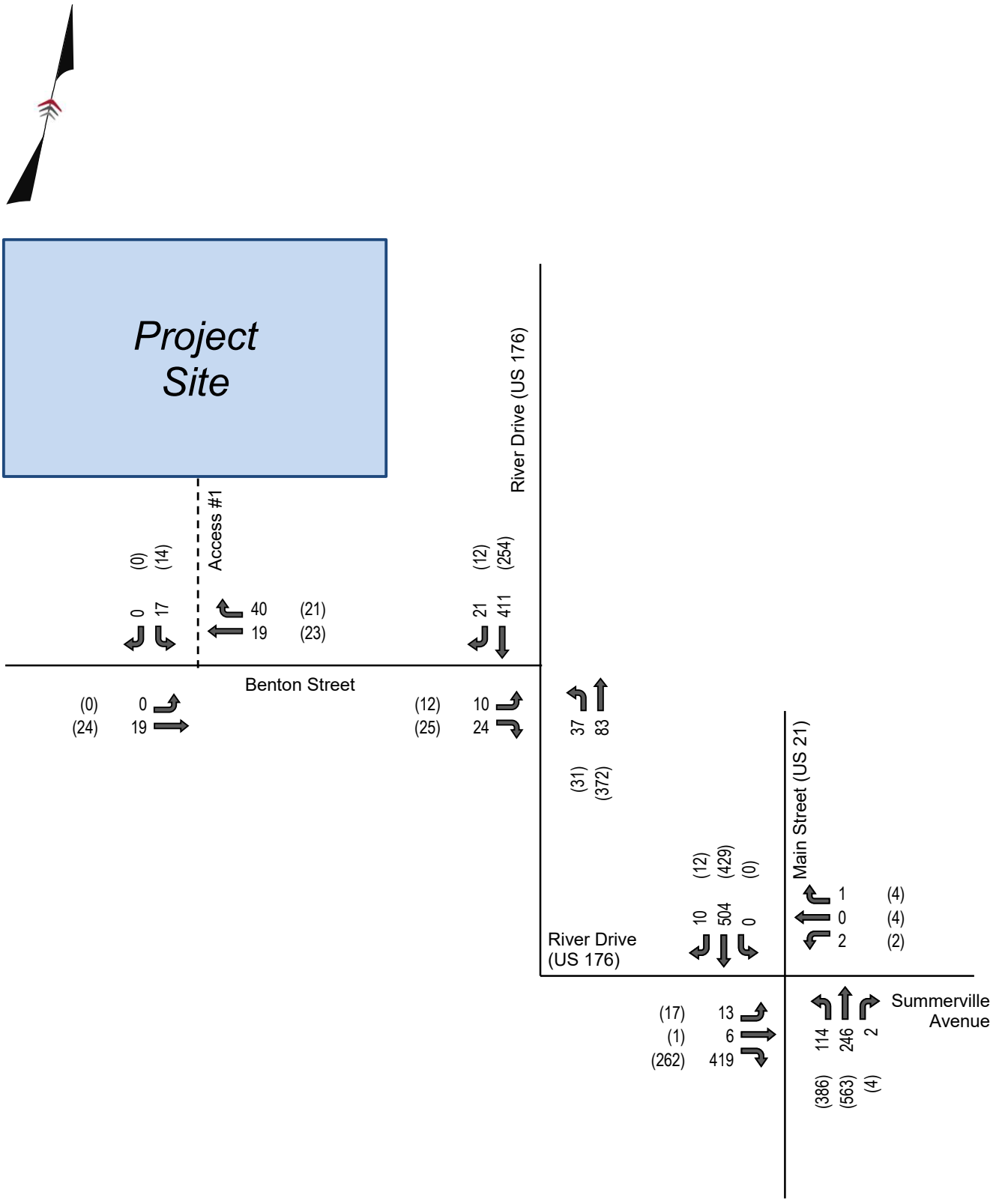
Figure 7 - 2024 No Build Peak-Hour Traffic Volumes



Legend

xx AM Peak-Hour Traffic Volumes

(xx) PM Peak-Hour Traffic Volumes

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Figure 8 - 2024 Build-Out Peak-Hour Traffic Volumes

4 Capacity Analysis

Capacity/Level-of-Service (LOS) analyses were conducted using the *Highway Capacity Manual (HCM),* 6th Edition and HCM 2000, methodologies of the *Synchro*, Version 10, traffic analysis software. Capacity analyses were conducted for the AM and PM peak hours of the 2021 existing conditions, 2024 no-build conditions, and 2024 build-out conditions.

Intersection level of service (LOS) grades range from LOS A to LOS F, which are directly related to the level of control delay at the intersection and characterize the operational conditions of the intersection traffic flow. LOS A operations typically represent ideal, free-flow conditions where vehicles experience little to no delays, and LOS F operations typically represent poor, gridlocked conditions with high vehicular delays, and are generally considered undesirable. Table 2 lists the LOS control delay thresholds published in the *HCM* for signalized and unsignalized intersections.

Table 2 – *HCM* Level of Service Criteria

LOS	Control Delay per Vehicle (sec/veh)	
	Signalized Intersections	Unsignalized Intersections
A	≤ 10	≤ 10
B	> 10 – 20	> 10 – 15
C	> 20 – 35	> 15 – 25
D	> 35 – 55	> 25 – 35
E	> 55 – 80	> 35 – 50
F	> 80	> 50

As part of the intersection analysis, SCDOT's default Synchro parameters were utilized. Existing peak-hour factors (PHF) were utilized for the existing scenarios and the PHFs for the future-year scenarios were adjusted to a minimum of 0.90 and maximum of 0.95. Existing heavy vehicle percentages were utilized for all scenarios, with a minimum of 2% considered.

The following sections outline the results of the capacity analysis for each of the study intersections. The capacity analysis worksheets are included in Appendix E. SimTraffic was utilized to estimate 95th percentile queues for the study area intersections. SimTraffic result reports are included in Appendix F.

4.1 River Drive (US 176) at Benton Street

The capacity analysis results for the River Drive (US 176) at Benton Street intersection are summarized in Table 3.

Table 3 – River Drive (US 176) at Benton Street Analysis Results

River Drive (US 176) at Benton Street		
Condition	Measure	EB (Benton Street) EBLR
AM Peak Hour		
2021 Existing	LOS (Delay)	B (10.8)
2024 No Build	LOS (Delay)	B (10.8)
2024 Build	LOS (Delay)	B (11.3)
PM Peak Hour		
2021 Existing	LOS (Delay)	B (11.1)
2024 No Build	LOS (Delay)	B (11.2)
2024 Build	LOS (Delay)	B (11.5)

For 2024 conditions, the results of the analysis indicate that the unsignalized approach along Benton Street will operate at LOS B in the AM and PM peak hour; therefore, no capacity improvements are recommended as a part of this TIS.

4.2 River Drive (US 176) at Main Street (US 21)

The capacity analysis results for the River Drive (US 176) at Main Street (US 21) intersection are summarized in Table 4.

Table 4 – River Drive (US 176) at Main Street (US 21) Analysis Results

River Drive (US 176) at Main Street (US 21)									
Condition	Measure	EB (River Drive)		WB (Summerville Avenue)	NB (Main Street)			SB (Main Street)		Intersection
		EBTL	EBR	WBTLR	NBL	NBT	NBTR	SBT	SBTR	
AM Peak Hour										
2021 Existing	LOS (Delay)	D (47.5)		E (58.8)	A (4.1)			A (9.1)		C (20.7)
2024 No Build	LOS (Delay)	D (47.5)		E (58.8)	A (4.1)			A (9.1)		C (20.7)
2024 Build	LOS (Delay)	D (47.3)		E (58.8)	A (4.1)			A (9.3)		C (20.6)
PM Peak Hour										
2021 Existing	LOS (Delay)	D (40.6)		E (65.4)	A (5.7)			B (12.6)		B (13.6)
2024 No Build	LOS (Delay)	D (40.0)		E (65.4)	A (5.0)			B (13.1)		B (13.2)
2024 Build	LOS (Delay)	D (37.9)		E (65.4)	A (5.3)			B (14.8)		B (13.5)

For 2024 build conditions, the results of the analysis indicate that the eastbound, northbound, and southbound approaches will operate at acceptable LOS conditions in the AM and PM peak hours. As shown in the table above, the westbound approach operates at LOS E during all scenarios and does not degrade as a result of the proposed development traffic. Therefore, no capacity improvements are recommended as a part of this TIS.

Utilizing SimTraffic, it was observed that the eastbound queue extends past the intersection of River Drive (US 176) at Benton Street in the existing and no build scenarios. In the build scenario, project traffic is not anticipated to significantly increase queueing on this approach. The SimTraffic queueing results are provided in Appendix F.

4.3 Benton Street at Access #1

The capacity analysis results for the Benton Street at Access #1 intersection are summarized in Table 5.

Table 5 – Benton Street at Access #1 Analysis Results

Benton Street at Access #1		
Condition	Measure	SB (Access #1)
		SBLR
AM Peak Hour		
2024 Build	LOS (Delay)	A (8.9)
PM Peak Hour		
2024 Build	LOS (Delay)	A (8.9)

The results of the capacity analysis indicate that the proposed access along Benton Street intersection will experience LOS A conditions in both the AM and PM peak hours; therefore, to accommodate site traffic accessing the proposed development:

- Install a southbound shared left/right egress lane and a single ingress lane

5 On-Site Parking

The on-site parking for the development was designed based on the requirements of the future zoning ordinance in Columbia that should take effect in August 2021. This ordinance will require a parking ratio between 1.2 and 1.5 spaces per unit. The parking provided as part of the development meets the intents and requirements of the Columbia Unified Development Ordinance, and the South Carolina State Housing Finance and Development Authority has determined that the amount of parking provided will be sufficient.

6 Conclusion

The proposed development is located just west of the intersection of River Drive (US 176) at Benton Street and is proposed to consist of up to 56 multifamily residential affordable housing units. The development is anticipated to access the roadway network via a single full-access project driveway along Benton Street.

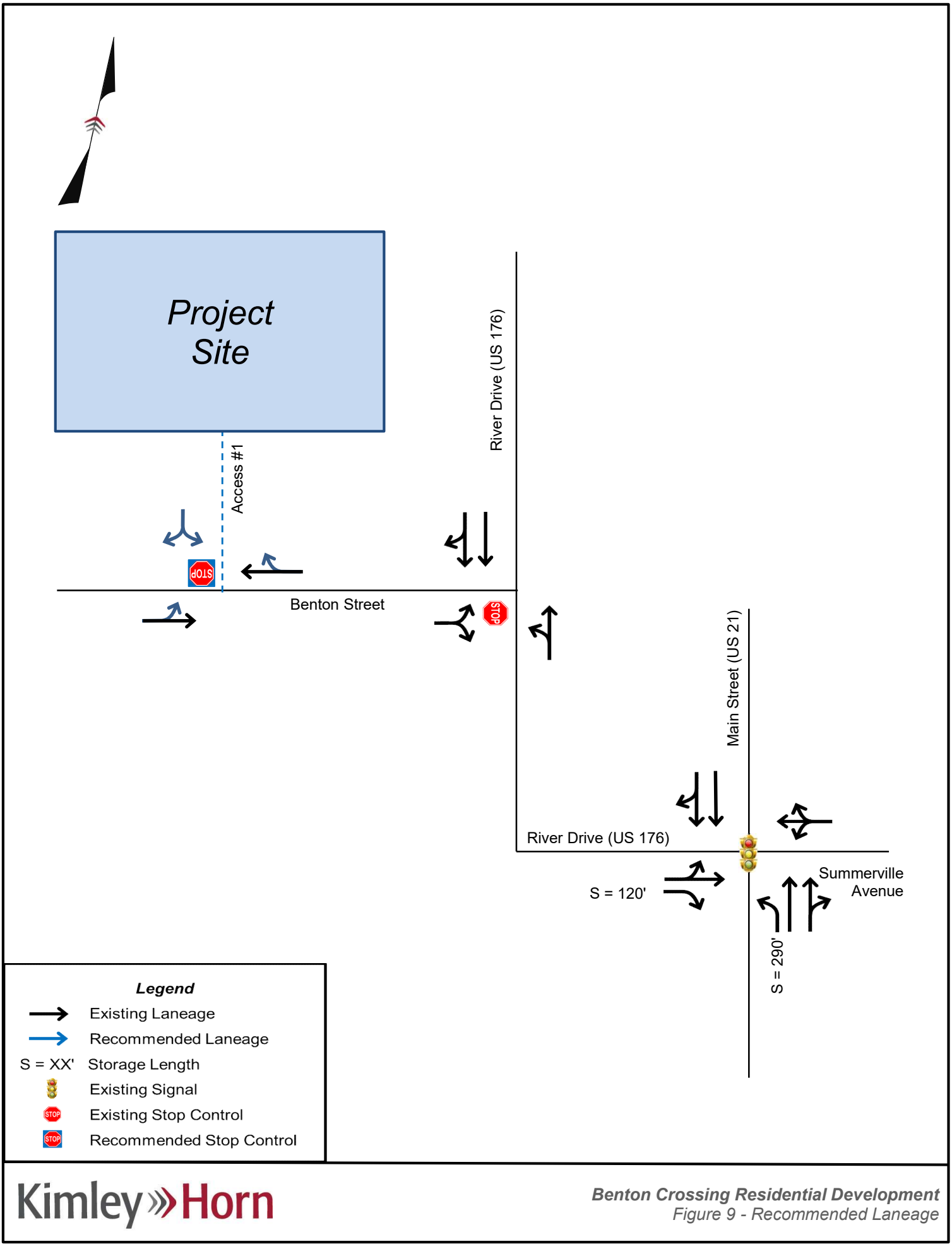
It was assumed that the development will be built and fully occupied by 2024. Therefore, future traffic conditions were evaluated for the 2024 horizon year. This study summarizes the results of the traffic analyses at the following three study intersections.

1) River Drive (US 176) at Benton Street
2) River Drive (US 176) at Main Street (US 21)
3) Benton Drive at Access #1

The results of the traffic analyses indicate the following improvements to accommodate site traffic accessing the proposed development:

Benton Street at Access #1

- Install a southbound shared left/right egress lane and a single ingress lane



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Benton Crossing Residential Development
Figure 9 - Recommended Laneage

Appendix A – Raw Turning Movement Counts

Prepared by National Data & Surveying Services

US 176/River Dr & Benton St

Peak Hour Turning Movement Count

ID: 21-150035-001
City: Columbia

Day: Wednesday
Date: 6/2/2021

PEAK HOURS		COUNT PERIODS
07:45 AM - 08:45 AM	AM	7:00 AM - 09:00 AM
NONE	NOON	NONE
04:45 PM - 05:45 PM	PM	4:00 PM - 06:00 PM

US 176/River Dr — SOUTHBOUND

	Right	Thru	Left	U-Turn	Exiting
AM	9	399	2	0	89
NOON	0	0	0	0	0
PM	6	247	2	0	373
	1	1	0	0	

Benton St — EASTBOUND

	AM	NOON	PM	
Exiting	19	0	22	
U-Turn	0	0	0	0
Left	5	0	8	0
Thru	1	0	0	1
Right	12	0	15	0

Benton St — WESTBOUND

		PM	NOON	AM
Right	0	4	0	3
Thru	1	0	0	1
Left	0	1	0	3
U-Turn	0	0	0	0
Exiting		4	0	6

US 176/River Dr — NORTHBOUND

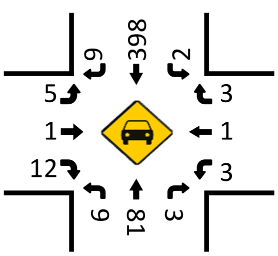
	Exiting	U-Turn	Left	Thru	Right
		0	0	1	0
PM	263	0	16	361	2
NOON	0	0	0	0	0
AM	414	0	9	81	3

CONTROL

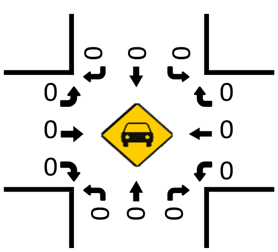
1-Way Stop(EB)

	AM	NOON	PM
TEV	528	0	662
PHF	0.84		0.93

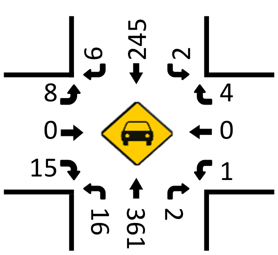
Cars (AM)



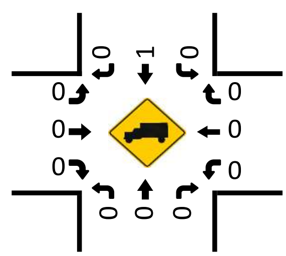
Cars (NOON)



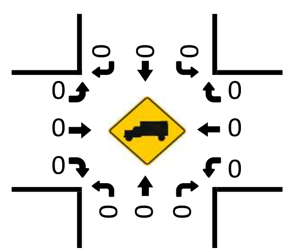
Cars (PM)



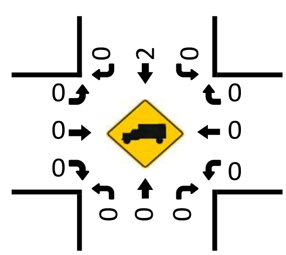
HT (AM)



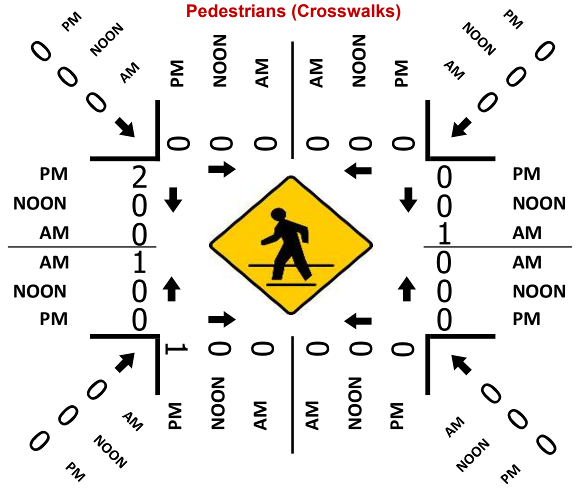
HT (NOON)



HT (PM)



Pedestrians (Crosswalks)



Prepared by National Data & Surveying Services

US 21/US 321/Main St & US 176/River Dr/Summerville Ave

Peak Hour Turning Movement Count

ID: 21-150035-002
City: Columbia

Day: Wednesday
Date: 6/2/2021

	PEAK HOURS	COUNT PERIODS
AM	07:45 AM - 08:45 AM	7:00 AM - 09:00 AM
NOON	NONE	NONE
PM	04:45 PM - 05:45 PM	4:00 PM - 06:00 PM

SOUTHBOUND (US 21/US 321/Main St)

	Right	Thru	Left	U-Turn	Departing
AM	4	498	0	0	250
NOON	0	0	0	0	0
PM	9	416	0	0	565
Lanes	0.5	1.5	0	0	

EASTBOUND (US 176/River Dr/Summerville Ave)

	AM	NOON	PM	Lanes
Departing	93	0	376	
U-Turn	0	0	0	0
Left	10	0	15	0.5
Thru	6	0	1	0.5
Right	398	0	247	1

WESTBOUND (US 176/River Dr/Summerville Ave)

	PM	NOON	AM	Lanes
Right	4	0	1	0
Thru	4	0	0	1
Left	2	0	2	0
U-Turn	0	0	0	0
Departing	5	0	8	

NORTHBOUND (US 21/US 321/Main St)

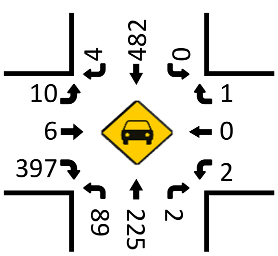
	Departing	U-Turn	Left	Thru	Right
Lanes		0	1	1.5	0.5
PM	665	0	363	546	4
NOON	0	0	0	0	0
AM	898	0	89	239	2

CONTROL

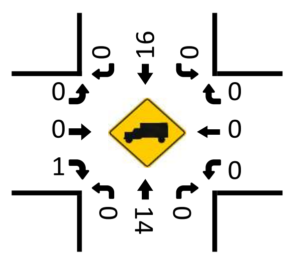
Signalized

	AM	NOON	PM
TEV	1249	0	1611
PHF	0.94		0.94

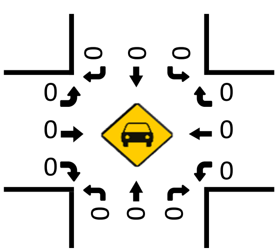
Cars (AM)



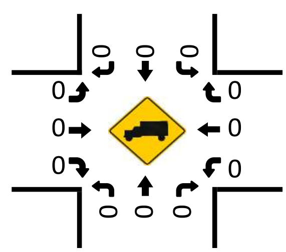
HT (AM)



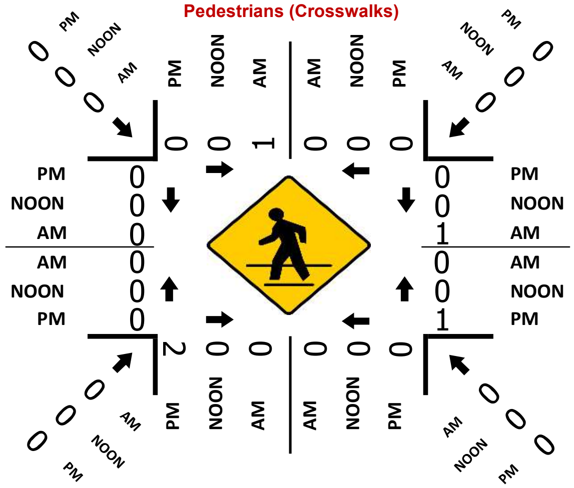
Cars (NOON)



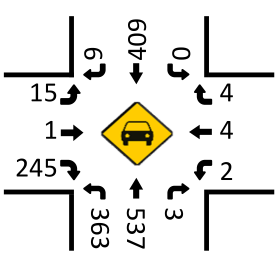
HT (NOON)



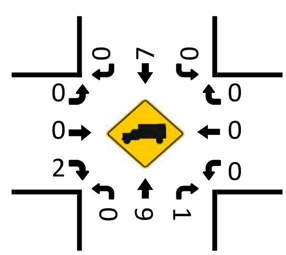
Pedestrians (Crosswalks)



Cars (PM)



HT (PM)



Appendix B – Signal Timing Information

SIGNAL EQUIPMENT

1 - EIGHT PHASE FULLY ACTUATED 2070L TRAFFIC SIGNAL CONTROLLER WITH FLASHER, 2070 SIGNAL MONITOR AND CABINET

4 - VEHICLE DETECTOR UNITS

6 - 12" THREE SECTION SIGNAL HEADS

2 - 12" FIVE SECTION SIGNAL HEADS

1 - 12" FOUR SECTION SIGNAL HEADS

6 - 16" PEDESTRIAN SIGNAL SIGNALS

2 - PEDESTRIAN PUSHBUTTONS

HEAD NUMBER	2	3A	3,5	4A	4B	5,2	6	P2,4,6
LENS	R Y G	R Y G	R Y G	R Y G	R Y G	R Y G	R Y G	
PHASE	2	3	3,5	4	4	5,2	6	P2,4,6
SIZE	12"	12"	12"	12"	12"	12"	12"	16"
QUANTITY	2	1	1	1	1	1	2	6

● MAST ARM POLE ⊗ PED POLE

Ⓐ
LEFT TURN
YIELD
ON GREEN
1ea.

Ⓑ
1ea.

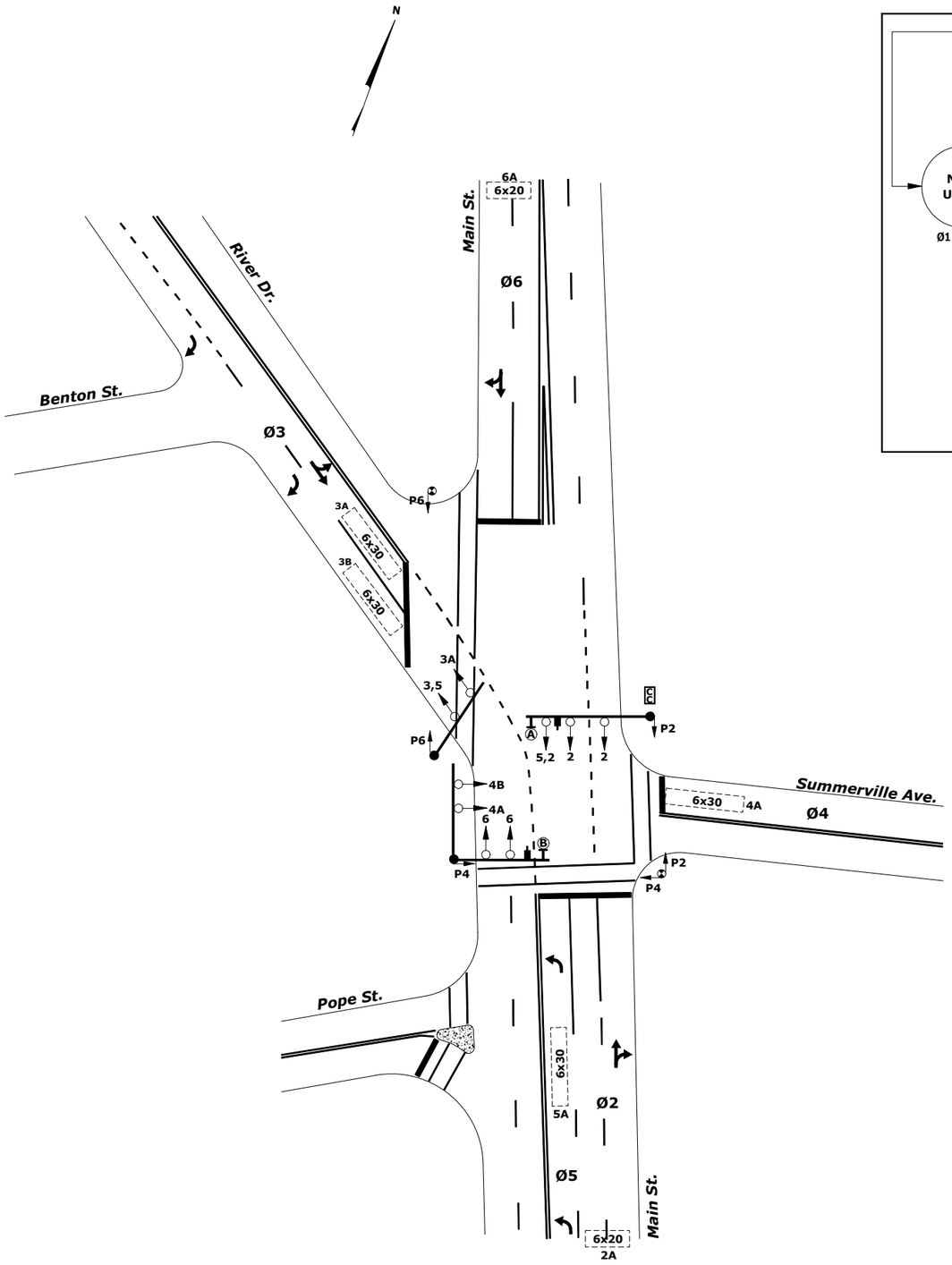
TRAFFIC SIGNAL SETTINGS

FUNCTIONS	SECONDS							
	Ø1	Ø2	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8
MIN GREEN		15	6	6	6	15		
ADDED INIT (SEC/ACT)								
MAX INITIAL								
PASSAGE		4	3	3	3	4		
TIME BEFORE REDUCE								
TIME TO REDUCE								
MIN GAP								
MAXIMUM I		35	28	16	15	35		
MAXIMUM II								
YELLOW CHANGE		4.0	4.0	4.0	4.0	4.0		
RED CLEAR		2.0	3.0	2.0	2.0	2.0		
RECALL		MIN						
DET. MEMORY								
L=LOCK, N=NON-LOCK								
DET. DELAY			NL	NL	NL			
DET. MODE								
P=PULSE PR=PRESENCE								
WALK		5		5		5		
PEDESTRIAN CLEAR		19		18		19		

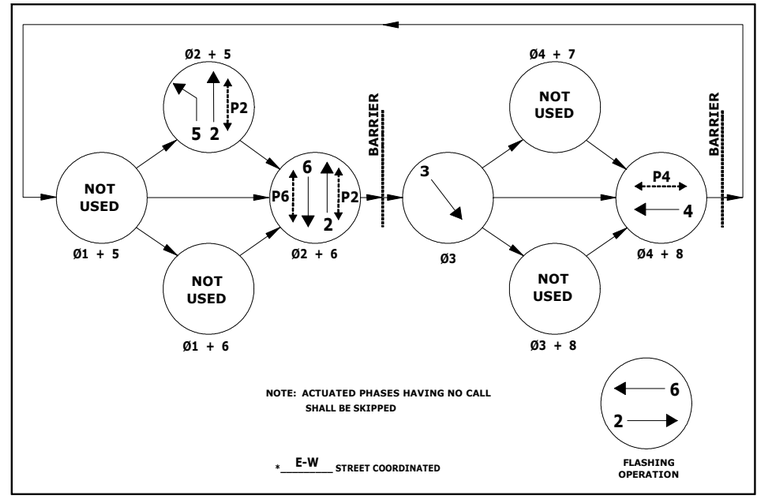
OVERLAP SETTINGS

OLA _____ OLC _____

OLB _____ OLD _____



PHASING DIAGRAM



SCDOT OWNED INTERSECTION

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 15225 DAVID D. BREWER

City Traffic Engineer

COLUMBIA
A Capital Place To Be

PUBLIC WORKS DEPARTMENT
TRAFFIC ENGINEERING DIVISION

SIGNAL PLAN

Main St. & River Dr.

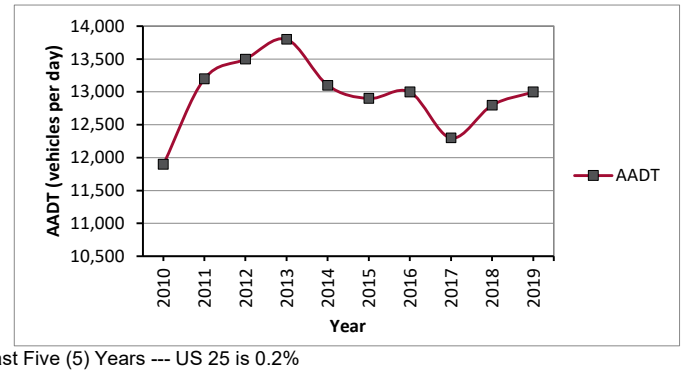
DATE	REVISION
9-19	

SCALE	DATE	INDEX NO.	
NTS	8-18		DRAWN BY: J. Holliday
			REVIEWED BY: D. Brewer

Appendix C – Historic Growth Rate Development Worksheet

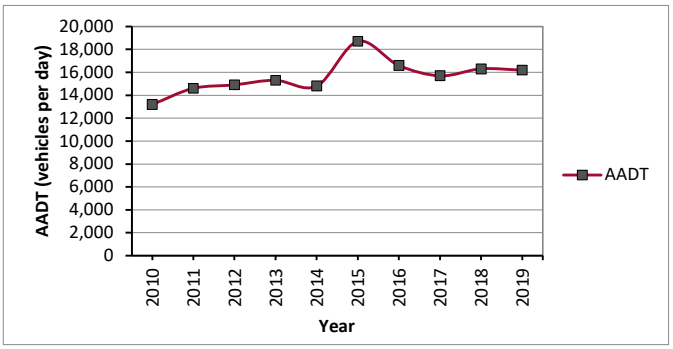
Annual Average Daily Traffic (AADT) from the South Carolina Department of Transportation (SCDOT)

Station	129
Route	US 25
Location	US 176 (MAIN ST) TO SC 16 (SUNSET DR)
2010	11,900
2011	13,200
2012	13,500
2013	13,800
2014	13,100
2015	12,900
2016	13,000
2017	12,300
2018	12,800
2019	13,000



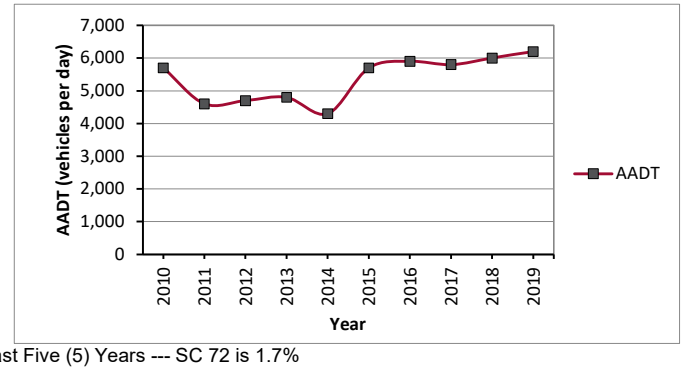
Annual Growth for Last Five (5) Years --- US 25 is 0.2%
Annual Growth for Last Ten (10) Years --- US 25 is 0.9%

Station	128
Route	US 21
Location	US 76 (ELMWOOD AVE), L- 3336 TO US 176 (MAIN ST)
2010	13,200
2011	14,600
2012	14,900
2013	15,300
2014	14,800
2015	18,700
2016	16,600
2017	15,700
2018	16,300
2019	16,200



Annual Growth for Last Five (5) Years --- US 21 is -2.8%
Annual Growth for Last Ten (10) Years --- US 21 is 2.1%

Station	185
Route	SC 72
Location	SC 16 (SUNSET DR), S- 126 TO US 21 (MAIN ST)
2010	5,700
2011	4,600
2012	4,700
2013	4,800
2014	4,300
2015	5,700
2016	5,900
2017	5,800
2018	6,000
2019	6,200



Annual Growth for Last Five (5) Years --- SC 72 is 1.7%
Annual Growth for Last Ten (10) Years --- SC 72 is 0.8%

TOTAL	
2010	30,800
2011	32,400
2012	33,100
2013	33,900
2014	32,200
2015	37,300
2016	35,500
2017	33,800
2018	35,100
2019	35,400

Total Study Area Annual Growth for Last Five (5) Years is -1%
Total Study Area Annual Growth for Last Ten (10) Years is 1.4%

Appendix D – Intersection Volume Development Worksheets

INTERSECTION TRAFFIC VOLUME DEVELOPMENT

INTERSECTION: River Drive at Benton Street
COUNT DATE: June 2, 2021
AM PEAK HOUR FACTOR: 0.85 **AM FUTURE PEAK HOUR FACTOR:** 0.90
PM PEAK HOUR FACTOR: 0.93 **PM FUTURE PEAK HOUR FACTOR:** 0.93

AM Peak Hour

AM 2021 EXISTING TRAFFIC	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
AM Adjusted Turning Movement Counts[1]	0	5	1	12	0	3	1	3	0	9	81	3	0	2	399	9
AM Volume Balancing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM 2021 EXISTING TRAFFIC	**0**	**5**	**1**	**12**	**0**	**3**	**1**	**3**	**0**	**9**	**81**	**3**	**0**	**2**	**399**	**9**
AM Heavy Vehicle Percentage	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	0%	2%
AM 2024 NO-BUILD TRAFFIC	**EBU**	**EBL**	**EBT**	**EBR**	**WBU**	**WBL**	**WBT**	**WBR**	**NBU**	**NBL**	**NBT**	**NBR**	**SBU**	**SBL**	**SBT**	**SBR**
Annual Growth Rate	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
AM 2024 NO-BUILD TRAFFIC GROWTH	0	0	0	0	0	0	0	0	0	0	2	0	0	0	12	0
AM 2024 NO-BUILD TRAFFIC (No AD)	0	5	1	12	0	3	1	3	0	9	83	3	0	2	411	9
AM 2024 NO-BUILD TRAFFIC	**0**	**5**	**1**	**12**	**0**	**3**	**1**	**3**	**0**	**9**	**83**	**3**	**0**	**2**	**411**	**9**

"SITE TRAFFIC DISTRUBUTION"

LAND USE	TYPE	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Net New	Entering		0%	0%	0%		0%	0%	0%		**70%**	0%	0%		0%	0%	**30%**
Distribution	Exiting		**30%**	0%	**70%**		0%	0%	0%		0%	0%	0%		0%	0%	0%

"AM PROJECT TRIPS"

LAND USE	TYPE	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Project Trip	Net New		**5**	0	**12**		0	0	0		**28**	0	0		0	0	**12**
AM TOTAL PROJECT TRIPS		**0**	**5**	**0**	**12**	**0**	**0**	**0**	**0**	**0**	**28**	**0**	**0**	**0**	**0**	**0**	**12**
AM 2024 BUILD-OUT TRAFFIC		**0**	**10**	**1**	**24**	**0**	**3**	**1**	**3**	**0**	**37**	**83**	**3**	**0**	**2**	**411**	**21**

PM Peak Hour

PM 2021 EXISTING TRAFFIC	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
PM Adjusted Turning Movement Counts[1]	0	8	0	15	0	1	0	4	0	16	361	2	0	2	247	6
PM Volume Balancing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM 2021 EXISTING TRAFFIC	**0**	**8**	**0**	**15**	**0**	**1**	**0**	**4**	**0**	**16**	**361**	**2**	**0**	**2**	**247**	**6**
PM Heavy Vehicle Percentage	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	1%	2%
PM 2024 NO-BUILD TRAFFIC	**EBU**	**EBL**	**EBT**	**EBR**	**WBU**	**WBL**	**WBT**	**WBR**	**NBU**	**NBL**	**NBT**	**NBR**	**SBU**	**SBL**	**SBT**	**SBR**
Annual Growth Rate	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
PM 2024 NO-BUILD TRAFFIC GROWTH	0	0	0	0	0	0	0	0	0	0	11	0	0	0	7	0
PM 2024 NO-BUILD TRAFFIC (No AD)	0	8	0	15	0	1	0	4	0	16	372	2	0	2	254	6
PM 2024 NO-BUILD TRAFFIC	**0**	**8**	**0**	**15**	**0**	**1**	**0**	**4**	**0**	**16**	**372**	**2**	**0**	**2**	**254**	**6**

"SITE TRAFFIC DISTRUBUTION"

LAND USE	TYPE	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Net New	Entering		0%	0%	0%		0%	0%	0%		**70%**	0%	0%		0%	0%	**30%**
Distribution	Exiting		**30%**	0%	**70%**		0%	0%	0%		0%	0%	0%		0%	0%	0%

"PM PROJECT TRIPS"

LAND USE	TYPE	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Project Trip	Net New		**4**	0	**10**		0	0	0		**15**	0	0		0	0	**6**
PM TOTAL PROJECT TRIPS		**0**	**4**	**0**	**10**	**0**	**0**	**0**	**0**	**0**	**15**	**0**	**0**	**0**	**0**	**0**	**6**
PM 2024 BUILD-OUT TRAFFIC		**0**	**12**	**0**	**25**	**0**	**1**	**0**	**4**	**0**	**31**	**372**	**2**	**0**	**2**	**254**	**12**

INTERSECTION TRAFFIC VOLUME DEVELOPMENT

INTERSECTION: River Dr at Main St
COUNT DATE: June 2, 2021
AM PEAK HOUR FACTOR: 0.94 **AM FUTURE PEAK HOUR FACTOR:** 0.94
PM PEAK HOUR FACTOR: 0.94 **PM FUTURE PEAK HOUR FACTOR:** 0.94

AM Peak Hour

AM 2021 EXISTING TRAFFIC	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
AM Adjusted Turning Movement Counts[1]	0	10	6	398	0	2	0	1	0	89	239	2	0	0	489	4
AM Volume Balancing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM 2021 EXISTING TRAFFIC	**0**	**10**	**6**	**398**	**0**	**2**	**0**	**1**	**0**	**89**	**239**	**2**	**0**	**0**	**489**	**4**
AM Heavy Vehicle Percentage	2%	2%	2%	0%	2%	2%	2%	2%	2%	2%	6%	2%	2%	2%	3%	2%
AM 2024 NO-BUILD TRAFFIC	**EBU**	**EBL**	**EBT**	**EBR**	**WBU**	**WBL**	**WBT**	**WBR**	**NBU**	**NBL**	**NBT**	**NBR**	**SBU**	**SBL**	**SBT**	**SBR**
Annual Growth Rate	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
AM 2024 NO-BUILD TRAFFIC GROWTH	0	0	0	12	0	0	0	0	0	3	7	0	0	0	15	0
AM 2024 NO-BUILD TRAFFIC (No AD)	0	10	6	410	0	2	0	1	0	92	246	2	0	0	504	4
AM 2024 NO-BUILD TRAFFIC	**0**	**10**	**6**	**410**	**0**	**2**	**0**	**1**	**0**	**92**	**246**	**2**	**0**	**0**	**504**	**4**

"SITE TRAFFIC DISTRUBUTION"

LAND USE	TYPE	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Net New	Entering		0%	0%	0%		0%	0%	0%		**55%**	0%	0%		0%	0%	**15%**
Distribution	Exiting		**15%**	0%	**55%**		0%	0%	0%		0%	0%	0%		0%	0%	0%

"AM PROJECT TRIPS"

LAND USE	TYPE	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Project Trip	Net New		**3**	0	**9**		0	0	0		**22**	0	0		0	0	**6**
AM TOTAL PROJECT TRIPS		**0**	**3**	**0**	**9**	**0**	**0**	**0**	**0**	**0**	**22**	**0**	**0**	**0**	**0**	**0**	**6**
AM 2024 BUILD-OUT TRAFFIC		**0**	**13**	**6**	**419**	**0**	**2**	**0**	**1**	**0**	**114**	**246**	**2**	**0**	**0**	**504**	**10**

PM Peak Hour

PM 2021 EXISTING TRAFFIC	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
PM Adjusted Turning Movement Counts[1]	0	15	1	247	0	2	4	4	0	363	546	4	0	0	416	9
PM Volume Balancing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM 2021 EXISTING TRAFFIC	**0**	**15**	**1**	**247**	**0**	**2**	**4**	**4**	**0**	**363**	**546**	**4**	**0**	**0**	**416**	**9**
PM Heavy Vehicle Percentage	2%	2%	2%	1%	2%	2%	2%	2%	2%	2%	2%	25%	2%	2%	2%	2%
PM 2024 NO-BUILD TRAFFIC	**EBU**	**EBL**	**EBT**	**EBR**	**WBU**	**WBL**	**WBT**	**WBR**	**NBU**	**NBL**	**NBT**	**NBR**	**SBU**	**SBL**	**SBT**	**SBR**
Annual Growth Rate	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
PM 2024 NO-BUILD TRAFFIC GROWTH	0	0	0	7	0	0	0	0	0	11	17	0	0	0	13	0
PM 2024 NO-BUILD TRAFFIC (No AD)	0	15	1	254	0	2	4	4	0	374	563	4	0	0	429	9
PM 2024 NO-BUILD TRAFFIC	**0**	**15**	**1**	**254**	**0**	**2**	**4**	**4**	**0**	**374**	**563**	**4**	**0**	**0**	**429**	**9**

"SITE TRAFFIC DISTRUBUTION"

LAND USE	TYPE	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Net New	Entering		0%	0%	0%		0%	0%	0%		**55%**	0%	0%		0%	0%	**15%**
Distribution	Exiting		**15%**	0%	**55%**		0%	0%	0%		0%	0%	0%		0%	0%	0%

"PM PROJECT TRIPS"

LAND USE	TYPE	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Project Trip	Net New		**2**	0	**8**		0	0	0		**12**	0	0		0	0	**3**
PM TOTAL PROJECT TRIPS		**0**	**2**	**0**	**8**	**0**	**0**	**0**	**0**	**0**	**12**	**0**	**0**	**0**	**0**	**0**	**3**
PM 2024 BUILD-OUT TRAFFIC		**0**	**17**	**1**	**262**	**0**	**2**	**4**	**4**	**0**	**386**	**563**	**4**	**0**	**0**	**429**	**12**

INTERSECTION TRAFFIC VOLUME DEVELOPMENT

INTERSECTION: Benton St at Access #1
COUNT DATE: June 2, 2021
AM PEAK HOUR FACTOR: 0.90 **AM FUTURE PEAK HOUR FACTOR:** 0.90
PM PEAK HOUR FACTOR: 0.90 **PM FUTURE PEAK HOUR FACTOR:** 0.90

AM Peak Hour

AM 2021 EXISTING TRAFFIC	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
AM Adjusted Turning Movement Counts[1]	0	0	18	0	0	0	18	0	0	0	0	0	0	0	0	0
AM Volume Balancing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM 2021 EXISTING TRAFFIC	**0**	**0**	**18**	**0**	**0**	**0**	**18**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
AM Heavy Vehicle Percentage	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
AM 2024 NO-BUILD TRAFFIC	**EBU**	**EBL**	**EBT**	**EBR**	**WBU**	**WBL**	**WBT**	**WBR**	**NBU**	**NBL**	**NBT**	**NBR**	**SBU**	**SBL**	**SBT**	**SBR**
Annual Growth Rate	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
AM 2024 NO-BUILD TRAFFIC GROWTH	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
AM 2024 NO-BUILD TRAFFIC (No AD)	0	0	19	0	0	0	19	0	0	0	0	0	0	0	0	0
AM 2024 NO-BUILD TRAFFIC	**0**	**0**	**19**	**0**	**0**	**0**	**19**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

"SITE TRAFFIC DISTRUBUTION"

LAND USE	TYPE	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Net New	Entering		0%	0%	0%		0%	0%	**100%**		0%	0%	0%		0%	0%	0%
Distribution	Exiting		0%	0%	0%		0%	0%	0%		0%	0%	0%		**100%**	0%	0%

"AM PROJECT TRIPS"

LAND USE	TYPE	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Project Trip	Net New		0	0	0		0	0	**40**		0	0	0		**17**	0	0
AM TOTAL PROJECT TRIPS		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**40**	**0**	**0**	**0**	**0**	**0**	**17**	**0**	**0**
AM 2024 BUILD-OUT TRAFFIC		**0**	**0**	**19**	**0**	**0**	**0**	**19**	**40**	**0**	**0**	**0**	**0**	**0**	**17**	**0**	**0**

PM Peak Hour

PM 2021 EXISTING TRAFFIC	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
PM Adjusted Turning Movement Counts[1]	0	0	23	0	0	0	22	0	0	0	0	0	0	0	0	0
PM Volume Balancing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM 2021 EXISTING TRAFFIC	**0**	**0**	**23**	**0**	**0**	**0**	**22**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
PM Heavy Vehicle Percentage	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
PM 2024 NO-BUILD TRAFFIC	**EBU**	**EBL**	**EBT**	**EBR**	**WBU**	**WBL**	**WBT**	**WBR**	**NBU**	**NBL**	**NBT**	**NBR**	**SBU**	**SBL**	**SBT**	**SBR**
Annual Growth Rate	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
PM 2024 NO-BUILD TRAFFIC GROWTH	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
PM 2024 NO-BUILD TRAFFIC (No AD)	0	0	24	0	0	0	23	0	0	0	0	0	0	0	0	0
PM 2024 NO-BUILD TRAFFIC	**0**	**0**	**24**	**0**	**0**	**0**	**23**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

"SITE TRAFFIC DISTRUBUTION"

LAND USE	TYPE	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Net New	Entering		0%	0%	0%		0%	0%	**100%**		0%	0%	0%		0%	0%	0%
Distribution	Exiting		0%	0%	0%		0%	0%	0%		0%	0%	0%		**100%**	0%	0%

"PM PROJECT TRIPS"

LAND USE	TYPE	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Project Trip	Net New		0	0	0		0	0	**21**		0	0	0		**14**	0	0
PM TOTAL PROJECT TRIPS		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**21**	**0**	**0**	**0**	**0**	**0**	**14**	**0**	**0**
PM 2024 BUILD-OUT TRAFFIC		**0**	**0**	**24**	**0**	**0**	**0**	**23**	**21**	**0**	**0**	**0**	**0**	**0**	**14**	**0**	**0**

Appendix E – Intersection Capacity Analysis Worksheets

2021 EXISTING CONDITIONS

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	12	9	83	411	9
Future Vol, veh/h	5	12	9	83	411	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	25
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	0	2
Mvmt Flow	6	13	10	92	457	10

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	574	234	467	0	-	0
Stage 1	462	-	-	-	-	-
Stage 2	112	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	464	769	1093	-	-	-
Stage 1	602	-	-	-	-	-
Stage 2	912	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	459	769	1093	-	-	-
Mov Cap-2 Maneuver	459	-	-	-	-	-
Stage 1	596	-	-	-	-	-
Stage 2	912	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.8	0.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1093	-	642	-	-
HCM Lane V/C Ratio	0.009	-	0.029	-	-
HCM Control Delay (s)	8.3	-	10.8	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	6	410	2	0	1	92	246	2	0	504	4
Future Volume (vph)	10	6	410	2	0	1	92	246	2	0	504	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	7.0		6.0		6.0	6.0			6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95			0.95	
Frt		1.00	0.85		0.95		1.00	1.00			1.00	
Flt Protected		0.97	1.00		0.97		0.95	1.00			1.00	
Satd. Flow (prot)		1804	1615		1722		1770	3403			3501	
Flt Permitted		0.76	1.00		1.00		0.41	1.00			1.00	
Satd. Flow (perm)		1414	1615		1779		760	3403			3501	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	11	6	436	2	0	1	98	262	2	0	536	4
RTOR Reduction (vph)	0	0	377	0	3	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	17	59	0	0	0	98	264	0	0	540	0
Heavy Vehicles (%)	2%	2%	0%	2%	2%	2%	2%	6%	2%	2%	3%	2%
Turn Type	Perm	NA	pt+ov	Perm	NA		pm+pt	NA			NA	
Protected Phases		3	3 5		4		5	2			6	
Permitted Phases	3			4			2					
Actuated Green, G (s)		9.3	16.2		1.2		90.5	90.5			77.6	
Effective Green, g (s)		9.3	16.2		1.2		90.5	90.5			77.6	
Actuated g/C Ratio		0.08	0.13		0.01		0.75	0.75			0.65	
Clearance Time (s)		7.0			6.0		6.0	6.0			6.0	
Vehicle Extension (s)		3.0			3.0		3.0	4.0			4.0	
Lane Grp Cap (vph)		109	218		17		631	2566			2263	
v/s Ratio Prot			c0.04				0.01	0.08			c0.15	
v/s Ratio Perm		0.01			c0.00		0.11					
v/c Ratio		0.16	0.27		0.00		0.16	0.10			0.24	
Uniform Delay, d1		51.7	46.6		58.8		4.1	3.9			8.9	
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Incremental Delay, d2		0.7	0.7		0.0		0.1	0.1			0.2	
Delay (s)		52.4	47.3		58.8		4.3	4.0			9.1	
Level of Service		D	D		E		A	A			A	
Approach Delay (s)		47.5			58.8			4.1			9.1	
Approach LOS		D			E			A			A	

Intersection Summary			
HCM 2000 Control Delay	20.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	60.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	15	16	361	247	6
Future Vol, veh/h	8	15	16	361	247	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	25
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	1	2
Mvmt Flow	9	16	17	388	266	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	691	136	272	0	-	0
Stage 1	269	-	-	-	-	-
Stage 2	422	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	394	888	1290	-	-	-
Stage 1	753	-	-	-	-	-
Stage 2	661	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	387	888	1290	-	-	-
Mov Cap-2 Maneuver	387	-	-	-	-	-
Stage 1	740	-	-	-	-	-
Stage 2	661	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.1	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1290	-	612	-	-
HCM Lane V/C Ratio	0.013	-	0.04	-	-
HCM Control Delay (s)	7.8	-	11.1	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	1	247	2	4	4	363	546	4	0	416	9
Future Volume (vph)	15	1	247	2	4	4	363	546	4	0	416	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	7.0		6.0		6.0	6.0			6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95			0.95	
Frt		1.00	0.85		0.95		1.00	1.00			1.00	
Flt Protected		0.96	1.00		0.99		0.95	1.00			1.00	
Satd. Flow (prot)		1779	1599		1745		1770	3530			3527	
Flt Permitted		0.35	1.00		1.00		0.44	1.00			1.00	
Satd. Flow (perm)		657	1599		1762		819	3530			3527	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	16	1	263	2	4	4	386	581	4	0	443	10
RTOR Reduction (vph)	0	0	210	0	4	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	17	53	0	6	0	386	585	0	0	452	0
Heavy Vehicles (%)	2%	2%	1%	2%	2%	2%	2%	2%	25%	2%	2%	2%
Turn Type	Perm	NA	pt+ov	Perm	NA		pm+pt	NA			NA	
Protected Phases		3	3 5		4		5	2			6	
Permitted Phases	3			4			2					
Actuated Green, G (s)		11.0	24.3		1.5		88.5	88.5			69.2	
Effective Green, g (s)		11.0	24.3		1.5		88.5	88.5			69.2	
Actuated g/C Ratio		0.09	0.20		0.01		0.74	0.74			0.58	
Clearance Time (s)		7.0			6.0		6.0	6.0			6.0	
Vehicle Extension (s)		3.0			3.0		3.0	4.0			4.0	
Lane Grp Cap (vph)		60	323		22		709	2603			2033	
v/s Ratio Prot			0.03				c0.06	0.17			0.13	
v/s Ratio Perm		c0.03			c0.00		c0.34					
v/c Ratio		0.28	0.16		0.27		0.54	0.22			0.22	
Uniform Delay, d1		50.8	39.5		58.7		5.7	5.0			12.3	
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Incremental Delay, d2		2.6	0.2		6.7		0.9	0.2			0.3	
Delay (s)		53.4	39.7		65.4		6.6	5.2			12.6	
Level of Service		D	D		E		A	A			B	
Approach Delay (s)		40.6			65.4			5.7			12.6	
Approach LOS		D			E			A			B	

Intersection Summary			
HCM 2000 Control Delay	13.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	53.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

2024 NO BUILD CONDITIONS

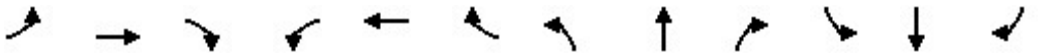
Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	12	9	83	411	9
Future Vol, veh/h	5	12	9	83	411	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	25
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	0	2
Mvmt Flow	6	13	10	92	457	10

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	574	234	467	0	-	0
Stage 1	462	-	-	-	-	-
Stage 2	112	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	464	769	1093	-	-	-
Stage 1	602	-	-	-	-	-
Stage 2	912	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	459	769	1093	-	-	-
Mov Cap-2 Maneuver	459	-	-	-	-	-
Stage 1	596	-	-	-	-	-
Stage 2	912	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.8	0.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1093	-	642	-	-
HCM Lane V/C Ratio	0.009	-	0.029	-	-
HCM Control Delay (s)	8.3	-	10.8	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	6	410	2	0	1	92	246	2	0	504	4
Future Volume (vph)	10	6	410	2	0	1	92	246	2	0	504	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	7.0		6.0		6.0	6.0			6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95			0.95	
Frt		1.00	0.85		0.95		1.00	1.00			1.00	
Flt Protected		0.97	1.00		0.97		0.95	1.00			1.00	
Satd. Flow (prot)		1804	1615		1722		1770	3403			3501	
Flt Permitted		0.76	1.00		1.00		0.41	1.00			1.00	
Satd. Flow (perm)		1414	1615		1779		760	3403			3501	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	11	6	436	2	0	1	98	262	2	0	536	4
RTOR Reduction (vph)	0	0	377	0	3	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	17	59	0	0	0	98	264	0	0	540	0
Heavy Vehicles (%)	2%	2%	0%	2%	2%	2%	2%	6%	2%	2%	3%	2%
Turn Type	Perm	NA	pt+ov	Perm	NA		pm+pt	NA			NA	
Protected Phases		3	3 5		4		5	2			6	
Permitted Phases	3			4			2					
Actuated Green, G (s)		9.3	16.2		1.2		90.5	90.5			77.6	
Effective Green, g (s)		9.3	16.2		1.2		90.5	90.5			77.6	
Actuated g/C Ratio		0.08	0.13		0.01		0.75	0.75			0.65	
Clearance Time (s)		7.0			6.0		6.0	6.0			6.0	
Vehicle Extension (s)		3.0			3.0		3.0	4.0			4.0	
Lane Grp Cap (vph)		109	218		17		631	2566			2263	
v/s Ratio Prot			c0.04				0.01	0.08			c0.15	
v/s Ratio Perm		0.01			c0.00		0.11					
v/c Ratio		0.16	0.27		0.00		0.16	0.10			0.24	
Uniform Delay, d1		51.7	46.6		58.8		4.1	3.9			8.9	
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Incremental Delay, d2		0.7	0.7		0.0		0.1	0.1			0.2	
Delay (s)		52.4	47.3		58.8		4.3	4.0			9.1	
Level of Service		D	D		E		A	A			A	
Approach Delay (s)		47.5			58.8			4.1			9.1	
Approach LOS		D			E			A			A	

Intersection Summary			
HCM 2000 Control Delay	20.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	60.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	15	16	372	254	6
Future Vol, veh/h	8	15	16	372	254	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	25
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	1	2
Mvmt Flow	9	16	17	400	273	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	710	140	279	0	-	0
Stage 1	276	-	-	-	-	-
Stage 2	434	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	384	883	1282	-	-	-
Stage 1	747	-	-	-	-	-
Stage 2	652	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	377	883	1282	-	-	-
Mov Cap-2 Maneuver	377	-	-	-	-	-
Stage 1	734	-	-	-	-	-
Stage 2	652	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.2	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1282	-	602	-	-
HCM Lane V/C Ratio	0.013	-	0.041	-	-
HCM Control Delay (s)	7.8	-	11.2	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	1	254	2	4	4	374	563	4	0	429	9
Future Volume (vph)	15	1	254	2	4	4	374	563	4	0	429	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	7.0		6.0		6.0	6.0			6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95			0.95	
Frt		1.00	0.85		0.95		1.00	1.00			1.00	
Flt Protected		0.96	1.00		0.99		0.95	1.00			1.00	
Satd. Flow (prot)		1779	1599		1745		1770	3530			3528	
Flt Permitted		0.45	1.00		1.00		0.43	1.00			1.00	
Satd. Flow (perm)		831	1599		1762		803	3530			3528	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	16	1	270	2	4	4	398	599	4	0	456	10
RTOR Reduction (vph)	0	0	213	0	4	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	17	57	0	6	0	398	603	0	0	465	0
Heavy Vehicles (%)	2%	2%	1%	2%	2%	2%	2%	2%	25%	2%	2%	2%
Turn Type	Perm	NA	pt+ov	Perm	NA		pm+pt	NA			NA	
Protected Phases		3	3 5		4		5	2			6	
Permitted Phases	3			4			2					
Actuated Green, G (s)		8.7	25.2		1.5		90.8	90.8			68.3	
Effective Green, g (s)		8.7	25.2		1.5		90.8	90.8			68.3	
Actuated g/C Ratio		0.07	0.21		0.01		0.76	0.76			0.57	
Clearance Time (s)		7.0			6.0		6.0	6.0			6.0	
Vehicle Extension (s)		3.0			3.0		3.0	4.0			4.0	
Lane Grp Cap (vph)		60	335		22		740	2671			2008	
v/s Ratio Prot			0.04				c0.07	0.17			0.13	
v/s Ratio Perm		c0.02			c0.00		c0.33					
v/c Ratio		0.28	0.17		0.27		0.54	0.23			0.23	
Uniform Delay, d1		52.7	38.8		58.7		5.1	4.3			12.8	
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Incremental Delay, d2		2.6	0.2		6.7		0.8	0.2			0.3	
Delay (s)		55.3	39.1		65.4		5.8	4.5			13.1	
Level of Service		E	D		E		A	A			B	
Approach Delay (s)		40.0			65.4			5.0			13.1	
Approach LOS		D			E			A			B	

Intersection Summary			
HCM 2000 Control Delay	13.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	54.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

2024 BUILD CONDITIONS

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	24	37	83	411	21
Future Vol, veh/h	10	24	37	83	411	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	25
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	0	2
Mvmt Flow	11	27	41	92	457	23

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	643	240	480	0	-	0
Stage 1	469	-	-	-	-	-
Stage 2	174	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	422	762	1081	-	-	-
Stage 1	597	-	-	-	-	-
Stage 2	856	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	405	762	1081	-	-	-
Mov Cap-2 Maneuver	405	-	-	-	-	-
Stage 1	573	-	-	-	-	-
Stage 2	856	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.3	2.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1081	-	605	-	-
HCM Lane V/C Ratio	0.038	-	0.062	-	-
HCM Control Delay (s)	8.5	-	11.3	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	6	419	2	0	1	114	246	2	0	504	10
Future Volume (vph)	13	6	419	2	0	1	114	246	2	0	504	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	7.0		6.0		6.0	6.0			6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95			0.95	
Frt		1.00	0.85		0.95		1.00	1.00			1.00	
Flt Protected		0.97	1.00		0.97		0.95	1.00			1.00	
Satd. Flow (prot)		1800	1615		1722		1770	3403			3495	
Flt Permitted		0.74	1.00		1.00		0.40	1.00			1.00	
Satd. Flow (perm)		1386	1615		1779		753	3403			3495	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	14	6	446	2	0	1	121	262	2	0	536	11
RTOR Reduction (vph)	0	0	385	0	3	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	20	61	0	0	0	121	264	0	0	546	0
Heavy Vehicles (%)	2%	2%	0%	2%	2%	2%	2%	6%	2%	2%	3%	2%
Turn Type	Perm	NA	pt+ov	Perm	NA		pm+pt	NA			NA	
Protected Phases		3	3 5		4		5	2			6	
Permitted Phases	3			4			2					
Actuated Green, G (s)		9.4	16.5		1.2		90.4	90.4			77.3	
Effective Green, g (s)		9.4	16.5		1.2		90.4	90.4			77.3	
Actuated g/C Ratio		0.08	0.14		0.01		0.75	0.75			0.64	
Clearance Time (s)		7.0			6.0		6.0	6.0			6.0	
Vehicle Extension (s)		3.0			3.0		3.0	4.0			4.0	
Lane Grp Cap (vph)		108	222		17		627	2563			2251	
v/s Ratio Prot			c0.04				0.01	0.08			c0.16	
v/s Ratio Perm		0.01			c0.00		0.13					
v/c Ratio		0.19	0.28		0.00		0.19	0.10			0.24	
Uniform Delay, d1		51.7	46.4		58.8		4.2	4.0			9.0	
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Incremental Delay, d2		0.8	0.7		0.0		0.2	0.1			0.3	
Delay (s)		52.5	47.1		58.8		4.4	4.0			9.3	
Level of Service		D	D		E		A	A			A	
Approach Delay (s)		47.3			58.8			4.1			9.3	
Approach LOS		D			E			A			A	

Intersection Summary			
HCM 2000 Control Delay	20.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	61.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	19	19	40	17	0
Future Vol, veh/h	0	19	19	40	17	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	21	21	44	19	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	65	0	-	0	64	43
Stage 1	-	-	-	-	43	-
Stage 2	-	-	-	-	21	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1537	-	-	-	942	1027
Stage 1	-	-	-	-	979	-
Stage 2	-	-	-	-	1002	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1537	-	-	-	942	1027
Mov Cap-2 Maneuver	-	-	-	-	942	-
Stage 1	-	-	-	-	979	-
Stage 2	-	-	-	-	1002	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	8.9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1537	-	-	-	942
HCM Lane V/C Ratio	-	-	-	-	0.02
HCM Control Delay (s)	0	-	-	-	8.9
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	12	25	31	372	254	12
Future Vol, veh/h	12	25	31	372	254	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	25
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	1	2
Mvmt Flow	13	27	33	400	273	13

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	746	143	286	0	-	0
Stage 1	280	-	-	-	-	-
Stage 2	466	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	365	879	1275	-	-	-
Stage 1	743	-	-	-	-	-
Stage 2	631	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	353	879	1275	-	-	-
Mov Cap-2 Maneuver	353	-	-	-	-	-
Stage 1	718	-	-	-	-	-
Stage 2	631	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.5	0.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1275	-	593	-	-
HCM Lane V/C Ratio	0.026	-	0.067	-	-
HCM Control Delay (s)	7.9	-	11.5	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	1	262	2	4	4	386	563	4	0	429	12
Future Volume (vph)	17	1	262	2	4	4	386	563	4	0	429	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	7.0		6.0		6.0	6.0			6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95			0.95	
Frt		1.00	0.85		0.95		1.00	1.00			1.00	
Flt Protected		0.95	1.00		0.99		0.95	1.00			1.00	
Satd. Flow (prot)		1779	1599		1745		1770	3530			3525	
Flt Permitted		0.42	1.00		1.00		0.42	1.00			1.00	
Satd. Flow (perm)		780	1599		1762		789	3530			3525	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	18	1	279	2	4	4	411	599	4	0	456	13
RTOR Reduction (vph)	0	0	213	0	4	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	19	66	0	6	0	411	603	0	0	468	0
Heavy Vehicles (%)	2%	2%	1%	2%	2%	2%	2%	2%	25%	2%	2%	2%
Turn Type	Perm	NA	pt+ov	Perm	NA		pm+pt	NA			NA	
Protected Phases		3	3 5		4		5	2			6	
Permitted Phases	3			4			2					
Actuated Green, G (s)		9.3	28.4		1.5		90.2	90.2			65.1	
Effective Green, g (s)		9.3	28.4		1.5		90.2	90.2			65.1	
Actuated g/C Ratio		0.08	0.24		0.01		0.75	0.75			0.54	
Clearance Time (s)		7.0			6.0		6.0	6.0			6.0	
Vehicle Extension (s)		3.0			3.0		3.0	4.0			4.0	
Lane Grp Cap (vph)		60	378		22		749	2653			1912	
v/s Ratio Prot			0.04				c0.09	0.17			0.13	
v/s Ratio Perm		c0.02			c0.00		c0.32					
v/c Ratio		0.32	0.17		0.27		0.55	0.23			0.24	
Uniform Delay, d1		52.3	36.5		58.7		5.4	4.5			14.5	
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Incremental Delay, d2		3.0	0.2		6.7		0.8	0.2			0.3	
Delay (s)		55.4	36.7		65.4		6.2	4.7			14.8	
Level of Service		E	D		E		A	A			B	
Approach Delay (s)		37.9			65.4			5.3			14.8	
Approach LOS		D			E			A			B	

Intersection Summary			
HCM 2000 Control Delay	13.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	54.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	24	23	21	14	0
Future Vol, veh/h	0	24	23	21	14	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	27	26	23	16	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	49	0	-	0	65	38
Stage 1	-	-	-	-	38	-
Stage 2	-	-	-	-	27	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1558	-	-	-	941	1034
Stage 1	-	-	-	-	984	-
Stage 2	-	-	-	-	996	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1558	-	-	-	941	1034
Mov Cap-2 Maneuver	-	-	-	-	941	-
Stage 1	-	-	-	-	984	-
Stage 2	-	-	-	-	996	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	8.9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1558	-	-	-	941
HCM Lane V/C Ratio	-	-	-	-	0.017
HCM Control Delay (s)	0	-	-	-	8.9
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Appendix F – Queueing and Blocking Worksheets

2021 EXISTING CONDITIONS

Queuing and Blocking Report
2021 Existing AM

06/08/2021

Intersection: 1: River Drive & Benton Street

Movement	EB	NB	SB	SB
Directions Served	LR	LT	T	TR
Maximum Queue (ft)	42	33	258	283
Average Queue (ft)	9	1	28	141
95th Queue (ft)	30	14	168	264
Link Distance (ft)	962	38	932	
Upstream Blk Time (%)		0		
Queuing Penalty (veh)		0		
Storage Bay Dist (ft)				25
Storage Blk Time (%)			0	47
Queuing Penalty (veh)			0	94

Intersection: 2: Main Street & River Drive/Summerville Avenue

Movement	EB	EB	WB	NB	NB	NB	SB	SB
Directions Served	LT	R	LTR	L	T	TR	T	TR
Maximum Queue (ft)	27	54	27	80	89	73	192	171
Average Queue (ft)	2	38	3	32	35	18	106	78
95th Queue (ft)	14	53	17	69	76	55	182	155
Link Distance (ft)	38	38	1029		1399	1399	1210	1210
Upstream Blk Time (%)	1	29						
Queuing Penalty (veh)	1	61						
Storage Bay Dist (ft)				290				
Storage Blk Time (%)								
Queuing Penalty (veh)								

Network Summary

Network wide Queuing Penalty: 156

Queuing and Blocking Report
2021 Existing PM

06/08/2021

Intersection: 1: River Drive & Benton Street

Movement	EB	NB	SB	SB
Directions Served	LR	LT	T	TR
Maximum Queue (ft)	47	55	36	178
Average Queue (ft)	12	6	1	58
95th Queue (ft)	32	31	12	139
Link Distance (ft)	1060	38	932	
Upstream Blk Time (%)		0		
Queuing Penalty (veh)		2		
Storage Bay Dist (ft)				25
Storage Blk Time (%)			0	22
Queuing Penalty (veh)			0	27

Intersection: 2: Main Street & River Drive/Summerville Avenue

Movement	EB	EB	WB	NB	NB	NB	SB	SB
Directions Served	LT	R	LTR	L	T	TR	T	TR
Maximum Queue (ft)	25	53	47	212	132	110	175	155
Average Queue (ft)	2	35	8	101	54	45	81	53
95th Queue (ft)	13	56	29	179	109	93	151	123
Link Distance (ft)	38	38	1029		1399	1399	1210	1210
Upstream Blk Time (%)	0	21						
Queuing Penalty (veh)	0	27						
Storage Bay Dist (ft)				290				
Storage Blk Time (%)								
Queuing Penalty (veh)								

Network Summary

Network wide Queuing Penalty: 56

2024 NO BUILD CONDITIONS

Queuing and Blocking Report
2024 No Build AM

06/08/2021

Intersection: 1: River Drive & Benton Street

Movement	EB	NB	SB	SB
Directions Served	LR	LT	T	TR
Maximum Queue (ft)	55	34	287	280
Average Queue (ft)	10	2	33	150
95th Queue (ft)	37	15	194	274
Link Distance (ft)	962	38	932	
Upstream Blk Time (%)		0		
Queuing Penalty (veh)		0		
Storage Bay Dist (ft)				25
Storage Blk Time (%)			0	48
Queuing Penalty (veh)			0	100

Intersection: 2: Main Street & River Drive/Summerville Avenue

Movement	EB	EB	WB	NB	NB	NB	SB	SB
Directions Served	LT	R	LTR	L	T	TR	T	TR
Maximum Queue (ft)	25	54	26	86	96	78	200	184
Average Queue (ft)	2	39	3	31	36	17	115	88
95th Queue (ft)	13	50	17	68	78	54	193	174
Link Distance (ft)	38	38	1029		1399	1399	1210	1210
Upstream Blk Time (%)	1	28						
Queuing Penalty (veh)	1	60						
Storage Bay Dist (ft)				290				
Storage Blk Time (%)								
Queuing Penalty (veh)								

Network Summary

Network wide Queuing Penalty: 161

Queuing and Blocking Report
2024 No Build PM

06/08/2021

Intersection: 1: River Drive & Benton Street

Movement	EB	NB	SB	SB
Directions Served	LR	LT	T	TR
Maximum Queue (ft)	43	50	69	185
Average Queue (ft)	11	6	3	60
95th Queue (ft)	30	30	38	141
Link Distance (ft)	1060	38	932	
Upstream Blk Time (%)		0		
Queuing Penalty (veh)		1		
Storage Bay Dist (ft)				25
Storage Blk Time (%)			0	22
Queuing Penalty (veh)			0	28

Intersection: 2: Main Street & River Drive/Summerville Avenue

Movement	EB	EB	WB	NB	NB	NB	SB	SB
Directions Served	LT	R	LTR	L	T	TR	T	TR
Maximum Queue (ft)	21	53	38	231	127	116	181	171
Average Queue (ft)	2	34	8	109	53	47	88	59
95th Queue (ft)	13	55	29	188	108	100	158	135
Link Distance (ft)	38	38	1029		1399	1399	1210	1210
Upstream Blk Time (%)	0	20						
Queuing Penalty (veh)	0	27						
Storage Bay Dist (ft)				290				
Storage Blk Time (%)				0				
Queuing Penalty (veh)				0				

Network Summary

Network wide Queuing Penalty: 57

2024 BUILD CONDITIONS

Queuing and Blocking Report
2024 Build AM

06/08/2021

Intersection: 1: River Drive & Benton Street

Movement	EB	NB	SB	SB
Directions Served	LR	LT	T	TR
Maximum Queue (ft)	104	54	365	288
Average Queue (ft)	32	11	45	152
95th Queue (ft)	86	40	231	277
Link Distance (ft)	171	38	933	
Upstream Blk Time (%)	0	1		
Queuing Penalty (veh)	0	1		
Storage Bay Dist (ft)				25
Storage Blk Time (%)				51
Queuing Penalty (veh)				104

Intersection: 2: Main Street & River Drive/Summerville Avenue

Movement	EB	EB	WB	NB	NB	NB	SB	SB
Directions Served	LT	R	LTR	L	T	TR	T	TR
Maximum Queue (ft)	20	52	25	96	115	62	212	182
Average Queue (ft)	2	38	2	38	36	16	114	88
95th Queue (ft)	12	52	14	77	81	50	191	168
Link Distance (ft)	38	38	1029		1399	1399	1210	1210
Upstream Blk Time (%)	1	30						
Queuing Penalty (veh)	1	65						
Storage Bay Dist (ft)				290				
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 3: Benton Street & Access #1

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	3	32
Average Queue (ft)	0	14
95th Queue (ft)	4	38
Link Distance (ft)	650	383
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 171

Intersection: 1: River Drive & Benton Street

Movement	EB	NB	SB	SB
Directions Served	LR	LT	T	TR
Maximum Queue (ft)	77	58	32	177
Average Queue (ft)	17	12	1	58
95th Queue (ft)	45	45	21	144
Link Distance (ft)	174	38	931	
Upstream Blk Time (%)		1		
Queuing Penalty (veh)		4		
Storage Bay Dist (ft)				25
Storage Blk Time (%)			0	22
Queuing Penalty (veh)			0	28

Intersection: 2: Main Street & River Drive/Summerville Avenue

Movement	EB	EB	WB	NB	NB	NB	SB	SB
Directions Served	LT	R	LTR	L	T	TR	T	TR
Maximum Queue (ft)	13	53	36	316	145	115	222	208
Average Queue (ft)	1	33	8	131	56	47	96	65
95th Queue (ft)	8	56	28	237	118	97	179	151
Link Distance (ft)	38	38	1029		1399	1399	1210	1210
Upstream Blk Time (%)		19						
Queuing Penalty (veh)		27						
Storage Bay Dist (ft)				290				
Storage Blk Time (%)				1				
Queuing Penalty (veh)				2				

Intersection: 3: Benton Street & Access #1

Movement	SB
Directions Served	LR
Maximum Queue (ft)	34
Average Queue (ft)	12
95th Queue (ft)	35
Link Distance (ft)	410
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 60

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Certificate Of Completion

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Status: Completed
Subject: Please DocuSign: 2021.06.29_BentonFinalReport.pdf
Source Envelope:
Document Pages: 62
Signatures: 1
Certificate Pages: 1
Initials: 0
AutoNav: Enabled
EnvelopeId Stamping: Enabled
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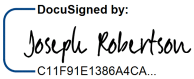
Envelope Originator:
Joseph Robertson
401 Fayetteville St.
Suite 600
Raleigh, NC 27601
Joseph.Robertson@kimley-horn.com
IP Address: 134.238.172.6

Record Tracking

Status: Original
6/29/2021 8:23:14 AM
Holder: Joseph Robertson
Joseph.Robertson@kimley-horn.com
Location: DocuSign

Signer Events	Signature	Timestamp
Joseph Robertson joseph.robertson@kimley-horn.com Security Level: Email, Account Authentication (None)	DocuSigned by:  C11F91E1386A4CA... Signature Adoption: Pre-selected Style Using IP Address: 134.238.172.6	Sent: 6/29/2021 8:24:06 AM Viewed: 6/29/2021 8:24:21 AM Signed: 6/29/2021 8:25:26 AM

Electronic Record and Signature Disclosure:
Not Offered via DocuSign

In Person Signer Events	Signature	Timestamp

Editor Delivery Events	Status	Timestamp

Agent Delivery Events	Status	Timestamp

Intermediary Delivery Events	Status	Timestamp

Certified Delivery Events	Status	Timestamp

Carbon Copy Events	Status	Timestamp

Witness Events	Signature	Timestamp

Notary Events	Signature	Timestamp

Envelope Summary Events	Status	Timestamps
Envelope Sent	Hashed/Encrypted	6/29/2021 8:24:06 AM
Certified Delivered	Security Checked	6/29/2021 8:24:21 AM
Signing Complete	Security Checked	6/29/2021 8:25:26 AM
Completed	Security Checked	6/29/2021 8:25:26 AM

Payment Events	Status	Timestamps